

POPULAR Computing

WEEKLY

29 July 1982 Vol 1 No 15

35p

Meltdown on Vic 20

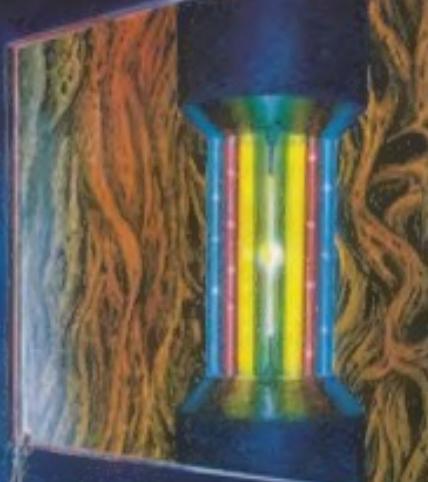
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repeat

Spectrum
fortune

Goto
destinations

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& ZX Printer -
details inside



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How to submit articles

Articles which are submitted for publication should not be more than 1000 words long.

All submissions should be typed and a double space should be left between each line.

Programmes should, whenever possible, be computer printed.

At present we cannot guarantee to return every submitted article, so please keep a copy.

Accuracy

Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week



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Editorial

In common with most other microcomputing magazines, we are inundated with programs. Every day readers send in programs in the hope of having them published in Open Forum.

However, most of these programs are based around a few basic games. Moonlander, Space Invader and Fruit Machine programs abound. Puckman is another favourite.

There is nothing wrong with these games. They have provided hours of fun and entertainment for micro-computer enthusiasts.

But, there is little purpose in re-inventing the wheel. While there is a certain amount of satisfaction to be gained from writing your own version of noughts and crosses or meteor run, there is far more satisfaction in writing a completely original program.

Once you have mastered the basics of programming, there is little point in continually imitating other people's efforts. You will learn more from thinking up your own games than you will from copying established programs.

Writing software programs is rather like learning to fly. There comes a point where you must go solo.

Next Week



A deadly assassin has disrupted your jungle Kingdom and must be eliminated in this new game for Spectrum — Hunter Killer

Sinclair to launch dial-a-program

SINCLAIR is developing a Prestel adaptor for the ZX Spectrum. It should be available in the first half of next year and will cost "substantially less than £100" according to Nigel Searle, head of Sinclair's computer division.

The Prestel adaptor will make it possible to both upload and download software from the Spectrum to Prestel. Instead of loading programs from cassettes or disks, you will be able to dial a program directly into the Spectrum via a TV set.

There are a number of advantages in using Prestel, or

teletext, and Searle, Telesoftware can be constantly updated and it obviates the need for large storage devices.

But, the key to the success of this scheme is the cost of the adaptor. Martechoice Ltd, winner of the British Telecom ZX81 Prestel adapter competition, will be charging in the region of £120-£150 for their adaptor when it goes on sale.

A Spectrum adaptor will be substantially cheaper, because the Spectrum already contains a colour modulator. But, even allowing for this, it is likely to cost at least £20 and possibly



Sinclair's Nigel Searle.

as much as £50.

However, Searle is convinced that telesoftware will play an increasingly important part in the home computer market. "The future of personal computing lies in communication," he said.

Dragon goes for a two-pronged attack

HARD on the heels of the announcement of the new Dragon 32 micro comes news of a further machine from Metrix.

The company is to produce an advanced Dragon in early 1983.

It will have 64K RAM, enhanced graphic capabilities and will probably include a disc-operating system and be capable of running CP/M software.

Aimed more at the business user, the machine will sell for about £250.

Development of the mini-floppy disk system for the Dragon 32 is well advanced and the system is planned to be available at the end of this year.

Japs aim for a supercomputer

THE development of a 'human' computer is the long-term aim of a new Japanese research program.

The 10-year project has been started by a team of workers in Japan. The hope is to make a 5th generation computer that will reason and speak much like a human.

The work, being carried out at the Institute for New Generation Computer Technology in Tokyo, is still in its initial stages.

The problem-solving and inference-making parts of the project will be key developments. It is hoped to produce a supercomputer that can make more than 100m logical inferences per second — an order of about 1000 times faster than present computers.

Reaction to the proposed development has been muted.

Welcome to the machine

THE British Passport Office has been evaluating equipment capable of handling machine-readable passports.

But already civil rights organisations fear a further invasion of individual privacy if the system was to be linked to other computers, such as the Police National Computer.

A Home Office spokesman has insisted that no such link is planned.



A pet watching at the Cleveland Boys' hike.

Setting Pets loose in wide-open spaces

PETS are venturing out into the moorlands.

The progress and safety of those taking part in the annual Cleveland Boy's Brigade hike, on June 26 and 27 has been monitored using a Commodore Pet.

The two-day event involves an exhausting traverse of the North Yorkshire moors. Each team must complete a course planned between 32 widely spaced checkpoints.

The Pet is used to provide up-to-date information of the stages of the event and to warn of groups that are overdue at their check-points.

Apart from the visual safety

that the micro system affords, it is also used to give a breakdown of each hiker's position, points, and overall time, within minutes of the last walker crossing the finishing line.

Soft soap from Sinclair

SINCLAIR is to give away a cassette of introductory programs with every ZX Spectrum.

By the end of August, each Spectrum buyer should receive a free *Felicities* software startpack. Those with Spectrums already will also get their packs, though it may be September before they arrive.

The *Harijins* cassette is preloaded for Sinclair by Prism.

On one side is a five-level keyboard trainer program. On the other side there are ten demonstration programs, putting the micro through its paces.

Sinclair is expected to release further software for the Spectrum shortly.

Spectrum now visibly extended

KEMPSTON Electronics has launched a selection of add-ons for the ZX Spectrum.

The company has produced a two-slot motherboard and a 24-line input/output port.

The port is accessed by the In and Out commands on the Spectrum. Built around a single MOS chip, the port is expandable and can be configured in a variety of ways. The three 8-bit I/O ports can be assigned as either In or Out by the Spectrum.

When the port is used together with the motherboard the second slot can be used for a stackable connector or to add a printer or microdrive.

THE I/O port costs £16.50. The two-slot motherboard costs £16.95. Both are available from Kempston (Micro) Electronics, 60 Adamson Court, Hillsgrove Road, Kempston, Bedford.

Gargle-blasting

SINCLAIR Research now has a staff of 42. Those not familiar with the *Hitch Hiker's Guide To The Galaxy* should note that this number is the answer to life, the universe, and everything.

READ-OUT

READ-OUT FOR
SOFTWARE & BOOKS

POPULAR COMPUTING WEEKLY/READ-OUT BOOK SERVICE

For the BBC Micro:

If you own a BBC Micro, the *Practical Programs for the BBC Computer* by David Johnson-Davies, is the book for you! It contains over twenty practical programs ranging from maths and graphics to language manipulation and games. The programs have been tested and they work!

Now that Auntie Beeb is actually delivering its micros to customers, *BASIC Programming on the BBC Microcomputer* by Neil and Pat Cryer will provide an excellent introduction on how to program in BASIC specifically for the BBC Micro. Every program has been tested on a production model.

For the ZX81:

Getting Deeper into Your ZX81 by Mark Harrison is the bestseller which tells you how to get to grips with your ZX81 and with 39 programs to match!

The *ZX81 Pocket Book* by Trevor Toms covers the use of the ZX81 in detail and leads the reader into a clear understanding of programming.

20 Simple Electronic Projects for the ZX81 by Stephen Adams can really put your ZX81 to practical use in a number of electronic projects — thermometer, burglar alarm, voltmeter etc.

34 Amazing Games for the ZX81 by Alistair Gourlay, shows you what you can do with only 1K of memory.

For the Beginner:

An excellent introduction for beginners and an invaluable aid for enthusiasts is *The Personal Computer Book* 2nd Edition by Robin Bradbeer which tells you all you need to know about microcomputers.

"...sets out in a very entertaining and readable form the facts on owning a computer..." Computing Today

"Robin Bradbeer's book provides all the information in one place, in a sensible order and in a consistent, clear style." Practical Computing

For the PET:

Learning to Use the PET Computer by Garry Marshall is the first in a series of books that introduces popular micros (others to follow are ZX81, ZX Spectrum, Vic-20 and BBC Microcomputer). It eases the reader into a clear understanding of his computer.

Programming the PET/CBM by Raeto West is quite simply the best book on the PET ever published. It contains everything you'll ever need to know about the PET and its workings.



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Letters

Write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

Whether tis nobler to have 10 megabytes etc.

WITH regard to Robed Lober's letter (PCW July 1), he says, "I am sure it is better to have a highly expandable system, with the most powerful Basic and the highest-res graphics for under £600, than a ZX Spectrum which can only play one note at a time compared with the BBC's four."

May I say that Mr Lober misses the point. The ZX Spectrum costs £125 compared with the BBC Model A's £299. It would be better to have a 10 megabyte computer that did the washing up than an unexpanded ZX81!

PS. Mr Lober also says that Sinclair claims the BBC micro has no *Vanity* command. This is incorrect... If you look in the "comparisons table" you will see there is a tick in the *Vanity* section of the BBC micro's column.

Michael West
101 Crayford Road
Plays All
Bromley BR1 5PL

I say, just a minor gripe or three . . .

I AM writing in response to your review (July 8) of the Dragon 32 micro. Of the computers which this machine is most likely to affect, most prominent is probably the Texas Instruments 99/4A, which is currently selling at Argos for £199 — quite a drop from the £240 which it sold for earlier in the year, and an even steeper drop from the £695 which I paid for my early NTSC 4 some two years ago.

What has really prompted my response is the statement in your Dragon review where you state that Print@ and Print Tab are fulfilling the same function. They most certainly do not. Somebody is missing something!

Print @ allows you to specify both a screen row and a screen column as the starting point for the printing of a page of information. This not only enables you to format the screen output very effectively, but also permits the printing of information in any sequence — i.e. first bottom of screen, then top, then middle, say — and without disturbing the current contents of the screen by scrolling.

Print Tab on the other hand, is a function of the standard Print command, which (a) allows the specification of a screen column only, and (b) follows the sequential print-out, perhaps involving scrolling on some machines, on others following the printout from top of screen to bottom.

To say that the two commands are virtually identical is to say that Input and Inkeys or Get are identical. That, they

perform similar functions, but would you say that only one was necessary?

Again from PCW, I have only one minor gripe. It is confusing when you refer to yourselves as PCW as *Personal Computer World* beat you to that one four years ago. The use of initials not only saves time when writing, it is also far easier to communicate verbally. The trouble is that now we have to differentiate between the two PCWs. Any suggestions?

Finally, I must echo the comment of one of your readers with respect to Citizen Paint. Either expand it into a full feature, or drop it altogether, please.

Peter Dossop
95 Anthony Road
Croydon CR0 5PR

Hey presto: you too can be an editor

RECENTLY I was looking through some of my old computer magazines and I stumbled across a letter in the *Peek & Poke* section of PCW issue number 5, from Simon Gray, who complained of not being able to edit. All he has to do is to clear the screen before he presses Edit and hey presto his line should appear at the bottom of the screen. I used to have the same problem when working in 1K on my ZX81.

John F. Ross
81 Camomile Street
Pine South
Sunderland
SR1 1PR

Having three bytes at the cherry

UNFORTUNATELY for program writers, when Sinclair de-bugged the ZX81 they changed the addresses of some of the routines in the Ram. In particular, Slow and Fast were both moved up by three bytes.

Consequently, readers who have machines with the new Rom should make the following changes to my Remloader program (June 17):

29 at 16517 should be changed to 28
33 at 16687 should be changed to 30

Dr L. F. W. Ross
21 Major Park
Croydon CR0 5PR

Just delighted to become debugged

As a Sinclair ZX81 user, I am very impressed by the aims of your magazine in bringing to the home computer user a combination of informative articles and programs in a weekly publication. However, I have found the error rate in your published programs a little annoying,

especially in your cover story programs.

I have only taken the trouble to key in two of these to date, and both had a number of errors. This is particularly disturbing when the programs are supposed to be "computer printed". One can only assume that your writers do not attempt to run the program fully once written. The particular programs I refer to are *Pinocchio* by Dave Middleton and *Shark Attack* by Dave McGuire. The bugs I refer to are as follows:

Pinocchio
Line 229 LET C = INT(RND(10))

This line, as printed, will always return the value 0 for C and, therefore, the cost of opening a mine will always be 17. The line should read LET C = INT(RND(10)).

Line 218 LET P = P + 1

This will only increase the population by one each year, irrespective of the number of immigrants calculated and displayed. The line should read LET P = P + 1.

In addition, there should be a line 6215 Pease 75 as the present listing clears the screen before the player has a chance to read the lines printed at 6205 and 6210.

I would also comment that, for a program which hinges around the screen display of written information for the player, the split display was most unimaginative. Judicious use of the Tab and Print@ functions would have improved this immeasurably.

Your response to this may be that you expect your readers to amend the published programs to their own taste. However, speaking for myself, if I have spent two hours keying in a program I have no desire to spend another two hours tidying it up before I am able to run it satisfactorily.

There are two errors in the *Shark Attack* program which, luckily, I was still able to weed out before I wasted a lot of time keying it in. This was because I have just started to work my way through Tom Baker's excellent book on machine code. Had I not had this advantage, I imagine that I would have spent several frustrating hours trying to get the program to run, and failed.

In the machine code loader there should be a line 55 LET A=A+1, otherwise the loader continues to Poke the code to 16514. The machine code routine should end with a return instruction (return to Basic) or the code will crash. There is therefore an additional byte to those printed which should have the value 201.

Once running, the program was immensely enjoyable. I think it is a pity that many of your readers were probably frustrated in their efforts to load the program correctly by these errors.

James Groomer
50 Danbury Road
Bolton St. John
Lancashire

COVER STORY

Meltdown

A new game for Vic20
by Malcolm North

You are in control of a nuclear power station. The automatic control systems have broken down. As the senior officer on duty, it is your responsibility to prevent the uranium core from going critical and covering the surrounding countryside with radioactive waste.

There is an emergency back-up system, complete with manual controls, for governing the power station. Unfortunately, the back-up system only has a limited power supply. When the power runs out, there is nothing to stop the core from going critical.

Your primary duty is to keep the core from melting down for as long as possible, giving the local population a chance to escape. If you manage to keep the station running for two and a half hours, a specialist repair team will arrive and mend the broken control systems.

The key to controlling the uranium core

lies in the carbon damper rods. These rods absorb the neutrons emitted by the uranium. Thus, by raising and lowering the rods, you can control the speed of the nuclear reactions inside the core.

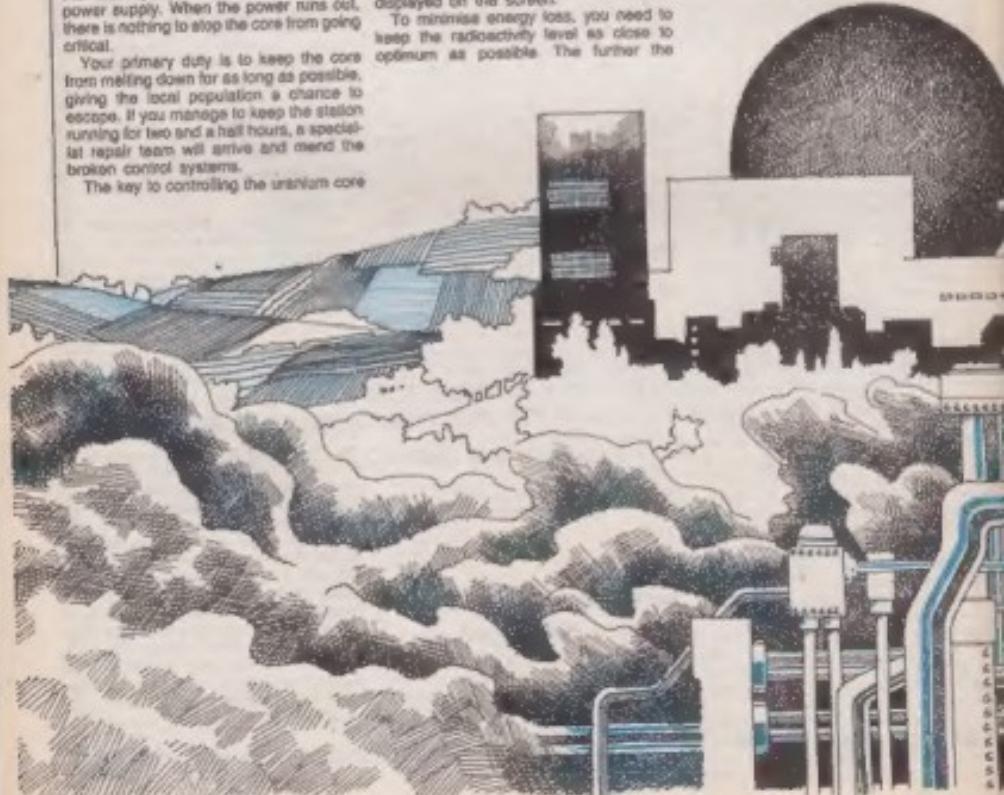
This program runs on an unexpanded Vic20. You can control the damper rods by means of the function keys.

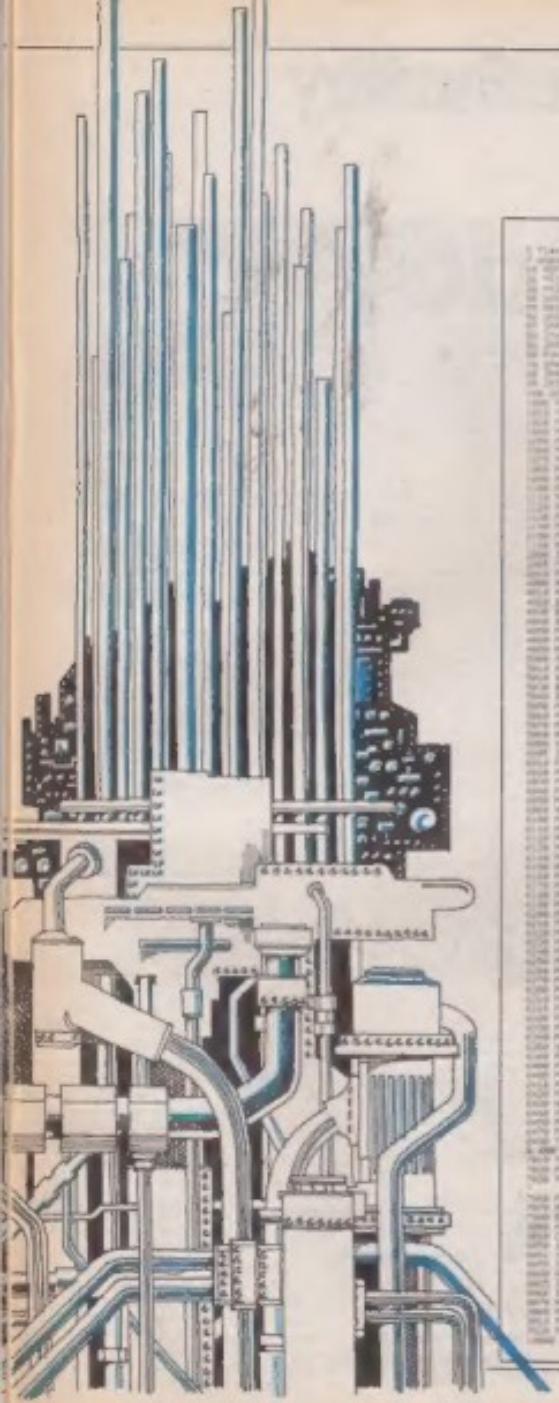
The damper rods, the level of radioactivity, the power supply for the back-up controls, and the elapsed time are all displayed on the screen.

To minimise energy loss, you need to keep the radioactivity level as close to optimum as possible. The further the

radioactivity level gets from the optimum point, the more power is used up. If the level of radioactivity gets too high, nothing can stop the core from melting down.

Just to make things more difficult, the longer the game goes on the faster the changes in the level of radioactivity in the core. It will take a skilful player to survive until the repair team arrives.





1. The following document is a technical description
of a process unit. It is intended for use by
engineers, technicians, and other personnel involved
in the design, construction, operation, and maintenance
of the unit. The document provides information on
the unit's function, design, and operating conditions.
The unit is a vertical tube heat exchanger, consisting
of a central vertical tube bundle and a surrounding
shell. The tube bundle contains a series of vertical
tubes, each with a different diameter and length.
The shell contains a series of horizontal plates, each
with a different width and height. The unit is supported
by a series of vertical legs and a horizontal base.
The unit is connected to a series of pipes and valves,
which are used to control the flow of fluid through
the unit. The unit is also connected to a series of
sensors and actuators, which are used to monitor
and control the unit's performance.
The unit is designed to operate under a variety of
conditions, including high temperatures and pressures.
The unit is also designed to be safe and reliable,
and to meet all relevant safety and quality standards.
The unit is a key component of a larger system,
and its performance is critical to the overall
operation of the system. The unit is a complex
and sophisticated piece of equipment, and its
design and operation require a high level of
expertise and knowledge.

Reader Survey

We would like to know more about you. To that end the eccentric academic Boris Allan has devised a novel way of allowing you to express your views. It is all done by numbers.

All you have to do is fill in the boxes below, write a slogan, send the page, or a copy, to PCW and you stand a chance of winning a £10 gift voucher.

Boris Allan writes: Some magazines are more alike than others. For example, some magazines usually have better love stories than others and magazines with recipes tend to have knitting patterns — but not always.

Use your judgment to make such comparisons and fill in these boxes on a scale from 1 to 7. If two items are more or less identical give a score of 1; eg. Your ideal computer magazine will always have bug-free programs put a 1 in that box.

If two items are totally different, or never go together, give a score of 7; eg if Your ideal computer magazine will never have Old news give a score of 7. If you do not know, give a score of 4. If you did not read one of the magazines leave the appropriate box blank.

Your Computer

Computer & Video games

Useful reviews

Old news

Interesting letters

Personal Computer World

Personal Computing Today

Bug-free programs

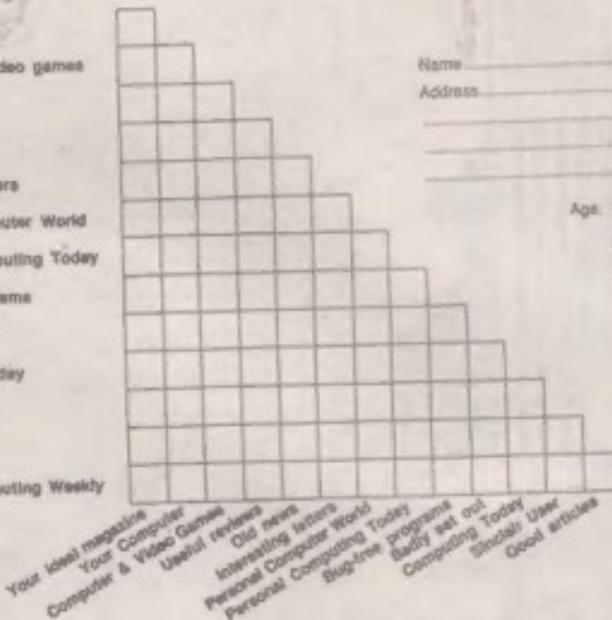
Badly set out

Computing Today

Sinclair User

Good articles

Popular Computing Weekly



What three things would you most like to see in Your ideal computer magazine?

1. 2. 3.

What three things would you not like to see in Your ideal computer magazine?

1. 2. 3.

Would you buy a binder to keep your copies of Popular Computing Weekly?

Yes No

Have you had difficulty finding copies of PCW. If so please say where

And now for the fun bit, which could win you some money. Pretend that you have been commissioned by a leading advertising agency to write a promotional slogan for Popular Computing Weekly:

My advertising line (in less than 15 words including the name Popular Computing Weekly) is

Now either cut out this page, or make a copy, and send it to Popular Computing Weekly, Hothouse Court, 19 Whitcomb Street, London WC2 7HF.

Street Life



The student Tony Letham with neighbour and brother John Knight

Their problems shared are soon solved

David Kelly talks to Tony Letham of the Computer Users' Club.

Someone must have once observed that the quickest way to learn about a person is to look at the place where they live.

Tony Letham's home gives many clues as to his main enthusiasm. Tucked away in every corner of his living room are bits and pieces of computers. And there is evidence all his framework everywhere. The sort of furniture is home-made and the lowered glass ceiling helps a compact disco-lighting arrangement.

He cheerfully recalls that he has been involved with electronics all his working life. As an engineer he trains electronics apprentices. When Tony first became interested in microcomputing everyone was still having to design their own — the Letham computer clutters up the bathroom for some time.

In July last year, Tony helped to set up the Computer Users' Group. Despite the fact that they keep a low profile and do not advertise knowledge of the group has spread by word of mouth. Now, 12 months after formation, the club has over 500 members.

The group offers a monthly newsletter and a friendly telephone or return-of-post problem-solving service.

Originally started by a small number of electronics students, who went their separate ways but stayed members, the Computer Users' Group has quickly become established as more than a local or regional group. Now it has members as far afield as the Outer Hebrides, Europe and even Africa.

Although members have all sorts ■

machines, Tony thought it important to standardise the output from the group. For this reason, shortly after the club began, the BBC micro was selected as the common medium of the group.

Since the size of the Computer Users' Group has grown it now takes three pairs of hands to keep it running... Tony, his wife Iris and a neighbour John Knight.

Most subscribers are professional or business people of one sort or another — chemists, headmasters, shopkeepers, doctors. As a result most of the information the club provides and disseminates in its monthly 15 page newsletter has tended to be applications-based.

Programs published by the club are thought out not just to be of direct use, but also, it is hoped, to demonstrate different programming techniques.

When the idea of an educational Hangman program was thought up, one of the group, who is a conductor provides a musical accompaniment for the game at www-dot-hamton. Another subscriber is using a micro to assist in the design of a 200.

When Tony and his cohorts first decided that they wanted to help people in difficulties with their micros, they thought of opening a shop.

When that proved to be too costly to set up, they organised the Computer Users' Group. With membership quickly increasing they are well pleased, and believe they are providing a much-needed service.

Membership costs £8 or £12 for either a six-month or twelve-month subscription.

For further details contact: Tony Letham, Computer Users' Club, 72 Sidmouth Road, Welling, Kent (Tel: 01304 28109).

What's happening

Streetly Computer Club has been formed and meets every second Sunday at the Streetly Community Centre, Foley Road East, Streetly. For more details contact Paul Fitzsimons, 86 Bankside Crescent, Streetly, Sutton Coldfield.

Putting on a joint show in Sussex

Six micro clubs in Sussex joined together to hold a mini computer show at Field School on Saturday June 12.

John Heron, the organiser, was very pleased with the way the show went. More than 500 people turned up to see the exhibits.

Among the attractions were stands from the six local groups with almost every type of micro being demonstrated.

The Field School computer facility was represented by Dave Frith who kept seven Pets in continuous operation.

Because of the success of this first Field show plans are already under way for another show next year.

The six groups involved were:

- Crawley ZX81 Users' Group. Contact John Heron, 23 Pelsworth Court, Bewbush, Crawley.

- Mid-Sussex Micro Computer Club. Contact: Bernard Langton, 7a, Broadwater Lane, Closses, Haywards Heath, Sussex.

- Brighton Area ZX80/81 Users' Group. Contact: John Ireland-Hill, 145 Godwin Road, Hove.

- Crawley Computer Club. Contact Chris Seager, 43 Jewel Walk, Bewbush, Crawley.

- Bognor Computer Group. Contact: Bill Vass, Greys Cottage, 38 Aldwick Avenue, Bognor.

- Hassocks ZX Micro Computer Users' Group. Contact: Paul King, 25 Fir Tree Way, Hassocks.

Below: There was plenty of interest at the Sussex micro show at Field



Reviews

software

Fortune

AVC Software, PO Box 415, Birmingham Spectrum, 16K/48K, cassette.
Price £2.00.

It is an obvious move, when a new machine appears, for software houses to take the easy way out and simply modify their existing library of programs!

This program is one such example — it is a Spectrum version of AVC's ZX81 program Madame ZX81!

AVC — one is always a little uncertain about buying programs from companies that hide behind a PO Box number — apparently specialize in learning programs. This is about the closest thing to a general interest title in their list.

The program begins by ascertaining the enquirer's vital statistics: name, sex, date of birth etc., and uses these to make predictions of the future.

After a few, not entirely successful attempts at humour, the fortune-teller displays a fairly accurate star-map of the relevant Zodiac sign with personal details superimposed.

There follows a description of the victim's personality, with a set of positive characteristics listed randomly together with suitable messages.

The program closes with a hopeful request for money. Presumably one is to cross the computer's palm with silver!

Fortune starts and restarts automatically and is fully menu-trapped. Consequently, it should be safe enough with hordes of summer law-breakers seeking advice concerning the future.

Summary

A reasonable program for those who have actually got their Spectrum. The new machine is so much more advanced than the ZX81, however, that converting games for the ZX81 is not necessarily the best way of providing Spectrum software. NJ

Program Enhancement

R & R Software, 34 Bourton Road, Tufley, Gloucester.
ZX81, 16K, cassette.
Price £5.55.

The Program Enhancement Package, or P-E-P, is a selection of subroutines to give greater flexibility to the screen display of the ZX81.

The P-E-P tape includes the package itself and a demonstration program to illustrate the scope of the facilities offered.

There are six short machine-code programs included in the cassette: Scroll, Fill-screen, Clear-screen, Inverse screen,

Fill-background and Fill-foreground.

In order to use these routines within a program under development by a user, the P-E-P must be loaded before the programming session is begun.

The P-E-P begins at line 9980 so there is plenty of room to write programs before the routines. The first line of any program written after the P-E-P has been entered should be Gosub 9980 in order to set up the P-E-P's mnemonics for the entry points to the subroutines and the control variables.

Scroll allows scrolling both up and down the screen. Fill-screen quickly fills the screen with any selected character. Clear-screen is a very fast clear screen facility.

Inverse-screen changes every character on the screen to its graphic inverse, and back again if used twice. Development of this will give a fast invert. Fill-background and Fill-foreground do just that within the same limits as those defined by the Fill-screen command.

The P-E-P cassette is supplied with an exhaustive booklet describing the use of the routines.

Summary

A useful selection of subroutines. Essential to anyone interested in graphics or animation on the ZX81.

DK pylon, are placed randomly inside the rectangle. Five robots are then placed on the screen and, finally, you appear.

The robots are programmed to break all three of Asimov's famous laws of robotics. In other words the robots are trying to kill you. The robots are, however, somewhat simple and with very little skill you can lead them to crash into one of the pylons. If, by chance, or lack of attention, you are ever in trouble, you can press the joystick control button to jump elsewhere on the screen.

After a couple of goes, all the intricacies of this game had been mastered. This is one of those games for a 3.5K Vic20 which would be fun and interesting to study if one could copy the listing out of a magazine. It is not worth spending £3.95 on it.

Another of Simon Taylor's programs is called Alien Blaster. This also sells for £3.95. The saving grace of this package is that both Robot Zap and Alien Blaster can be bought on the same cassette for £6.95.

Alien Blaster is a far more involving game which makes impressive use of the Vic's graphics and sound facilities. In the centre of the screen see your laser gun sights. Alien spacecraft appear on the screen one by one.

With a bit of effort on the joystick you can pull the alien ships into your sights and fire at them. The game is a race against your dwindling energy reserves. You start off with 200 units of energy but every shot uses up 10 units. The alien craft 100 beds and every hit takes 50 units off you.

You can replenish your resources by destroying the alien ships. For a program written in Basic on a 3.5K Vic it is quite impressive and certainly better value for money than many of the other Vic programs or cartridges on the market. You choose for yourself whether to buy Alien Blaster by itself for £3.95 or Robot Zap and Alien Blaster together for £4.95.

Blitz

Commodore, 675 Ajax Avenue, Slough Trading Estate, Slough, Berkshire. Vic20 (no Ram expansion required). Price £4.99.

As the pilot of a bomber plane, your objective in this game is to flatten the city below so that you can land without crashing. The plane descends until it passes over the city, so if you fail to descend the city will crash into the side of a building.

This simple and addictive program is one of the better games in the Commodore stable. It is difficult, but not impossible, to succeed in landing the plane. The problem is that you can only release one bomb at a time, and you cannot drop a second bomb until the first one has exploded.

Robot Zap

Available from Adda Home Computers Ltd, 154 Victoria Street, London W3 and other Vic20 dealers.
Vic20, cassette 3.5K.
Price £2.95.

Robot Zap is one of six Vic20 programs written and sold by Simon Taylor of Taysoft. His name appears in some of the official Commodore Vic20 software lists.

The game uses joystick or keyboard control. A rectangular box is created in red on the screen and ten black crosses, or

Reviews

hardware

Your Own Computer

By Michael Waste and Michael Pardee
Sams, 222pp, pb.
Price £3.50

Little known in this country, Howard Sams is one of America's largest and most prolific computing publishers.

On the whole their publications tend to look rather unappealing — and this book is no exception. The impression from a casual view is that the design and presentation are anything but eye-catching.

The book is a fairly important one however. It provides a reasonably successful beginners guide to microcomputing, combined with a brief buyer's guide.

The main drawback of *Your Own Computer* is that the view it takes is primarily an American one. There are books published in this country, such as *The Practical Computer Book* by Robin Bradbee which deal with the topic in a more informative and relevant way for a UK reader.

However, it does offer a very interesting picture of home computing in the US. The authors talk of 30 computers commonly found in American homes. Although the list includes well known machines such as ZX80s, Alans, TRS80s and Apples, it also includes less familiar ones, such as Cromemco. Costing as much as \$10,000, these higher priced micros are apparently not unusual additions to American domestic life.

Summary

Although it may not be as useful to micro owners in the UK as it has been to those in America, the book is still worth a look. KJ

Keyboard Repeat

Haven Handweir, 4 Asby Road, Asby, Workington, Cumbria
Price £3.50 (half) and £4.95 (full)

A device which makes the keys of a ZX81 repeat after a certain time can be very useful.

Just think over the number of times that you have had to slowly tap the cursor keys to get back to a mistake in order to amend it.

Another use is when making up Rem statements for use with machine code where up to 256 characters have to be entered to store the code at the beginning of a program.

This little printed-circuit board, approximately one inch square, will provide this facility if you are willing to pick up a soldering iron. The board has to be soldered to nine points on the ZX81's printed-circuit board. Five of these links go to the data lines from the ZX keyboard and two



Keyboard Repeat (top), Inverse Video Module (bottom). Both units are about 10cm x 7cm.

go to the +5 and 0 volts. The other two are attached to two control signals beneath the Z80A microprocessor.

Fitting these connections is fairly straightforward if you have used a soldering iron before. If you haven't then there is a problem, since the instructions will give you no hints at all.

Again, the fitting of a kit will cause no problems if those used to a soldering iron.

On the reverse side there are no sockets even though the instructions include a warning that they are recommended. The capacitors within the soldered vertically instead of being positioned on the board as shown in the diagram to supplement the unit. This makes it impossible to close the case unless the printed-circuit board was turned round so that the capacitors were against the ZX81's circuit board.

Once fitted, the board worked well and every key repeats even when used with Shift.

Summary

The board works very well when fitted beneath the keyboard on the ZX81 and will even work with other keyboards I tried. Build kits could, however, be assembled so that they can be fitted more easily. The instructions also need some revision to be more explanatory than at present. SA

Inverse Video Module

Haven Handweir, 4 Asby Road, Asby, Workington, Cumbria
Price £4.95

This unit, about the size of a 10p piece, is supplied fully assembled and ready to solder on to the video modulator of a ZX80 or ZX81.

The simple connections to the printed-circuit board are (a) +5 volts, (b) 0 volt, (c) video in from the printed-circuit board, and (d) video out to the metal-can video modulator.

One additional tag has to be made to the ZX81 circuitry, which is to remove the video modulator circuit out of the module or from the printed-circuit board. This is then connected to the inverse video modulator instead.

The printed-circuit board is small enough to fit underneath the video modulator inside the case.

The instructions are simple enough to follow but no return soldering is needed. A change-over switch can be fitted if required to switch between inverse video and normal. This is not included in the kit, but a suitable switch can be obtained in any electrical store.

The one difficulty encountered with the unit was its instability. The 4700 pF capacitor required changing to a 0.1 μ F. After this, the video could be adjusted by means of the variable resistor into the inverse video range. All this should be done of course after the circuit has been switched on again after soldering.

Summary

This is a useful unit, allowing the use of a ZX81 on its previously considered unusable because of their high sensitivity. However, it is doubtful that inverse video in this case write on black is, as claimed by the manufacturer, clearer than the more usual black on white. The instructions could be better and clearer. Problems, such as that found with the capacitor, could be avoided by testing the units more thoroughly. The price is quite cheap and well within the ZX user's price range. SA

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Spectrum

Watching the characters as they grow . . .

Martin Houston explains how to create user defined characters.

This is a utility program called Chrmaker for the ZX Spectrum.

Page 94 of the Spectrum manual gives a

simple three line program for creating user defined characters:

```
10 POKIN=80 TO 7
20 INPUT ROW,POKE USR P+N,ROW
30 NEXT N
```

In this case "P" is the graphic character that is re-defined.

But this approach has several disadvantages. The usage of Row has either to be worked out or entered in bin format. In addition, there is no feedback to the user as the character is built up.

With my program a character can be built up and edited with a large screen

display showing how it looks. Binary strings input by the user are also displayed as eight decimal numbers suitable for defining the same character from within the user's own programs, using the keyboard mechanism.

The program is a fast and enjoyable way of defining and editing the Spectrum character set.

Incidentally, I wrote this program on the day after my Spectrum arrived. This shows how fast it is to get used to the Spectrum, particularly for anyone who has used a Z80!

```
10 REM User defined character
20 REM Program
30 REM New version of Chrmaker
40 REM Version 1.0
50 REM Author: Martin Houston
60 REM Matrix size
70 REM DIM (B$10,81) REM Matrix arr
80 REM
90 PRINT AT 0,9, " "
100 REM PRINT "Input the 8x8 matrix
110 REM of the character along
120 REM lines. Using 0 to 1 to
130 REM make binary strings.
140 REM INPUT A$10,8
150 REM POKIN$ TO 81$0
160 REM BRIGHT 1, PRINT AT 11,12,13,14
170 REM 10,11,12,13,14,15,16,17
180 REM 11,12,13,14,15,16,17,18
190 REM 12,13,14,15,16,17,18,19
200 REM 13,14,15,16,17,18,19,20
210 REM 14,15,16,17,18,19,20,21
220 REM 15,16,17,18,19,20,21,22
230 REM 16,17,18,19,20,21,22,23
240 REM 17,18,19,20,21,22,23,24
250 REM 18,19,20,21,22,23,24,25
260 REM 19,20,21,22,23,24,25,26
270 REM 20,21,22,23,24,25,26,27
280 REM 21,22,23,24,25,26,27,28
290 REM 22,23,24,25,26,27,28,29
300 REM 23,24,25,26,27,28,29,30
310 REM 24,25,26,27,28,29,30,31
320 REM 25,26,27,28,29,30,31,32
330 REM 26,27,28,29,30,31,32,33
340 REM 27,28,29,30,31,32,33,34
350 REM 28,29,30,31,32,33,34,35
360 REM 29,30,31,32,33,34,35,36
370 REM 30,31,32,33,34,35,36,37
380 REM 31,32,33,34,35,36,37,38
390 REM 32,33,34,35,36,37,38,39
400 REM 33,34,35,36,37,38,39,40
410 REM 34,35,36,37,38,39,40,41
420 REM 35,36,37,38,39,40,41,42
430 REM 36,37,38,39,40,41,42,43
440 REM 37,38,39,40,41,42,43,44
450 REM 38,39,40,41,42,43,44,45
460 REM 39,40,41,42,43,44,45,46
470 REM 40,41,42,43,44,45,46,47
480 REM 41,42,43,44,45,46,47,48
490 REM 42,43,44,45,46,47,48,49
500 REM 43,44,45,46,47,48,49,50
510 REM 44,45,46,47,48,49,50,51
520 REM 45,46,47,48,49,50,51,52
530 REM 46,47,48,49,50,51,52,53
540 REM 47,48,49,50,51,52,53,54
550 REM 48,49,50,51,52,53,54,55
560 REM 49,50,51,52,53,54,55,56
570 REM 50,51,52,53,54,55,56,57
580 REM 51,52,53,54,55,56,57,58
590 REM 52,53,54,55,56,57,58,59
600 REM 53,54,55,56,57,58,59,60
610 REM 54,55,56,57,58,59,60,61
620 REM 55,56,57,58,59,60,61,62
630 REM 56,57,58,59,60,61,62,63
640 REM 57,58,59,60,61,62,63,64
650 REM 58,59,60,61,62,63,64,65
660 REM 59,60,61,62,63,64,65,66
670 REM 60,61,62,63,64,65,66,67
680 REM 61,62,63,64,65,66,67,68
690 REM 62,63,64,65,66,67,68,69
700 REM 63,64,65,66,67,68,69,70
710 REM 64,65,66,67,68,69,70,71
720 REM 65,66,67,68,69,70,71,72
730 REM 66,67,68,69,70,71,72,73
740 REM 67,68,69,70,71,72,73,74
750 REM 68,69,70,71,72,73,74,75
760 REM 69,70,71,72,73,74,75,76
770 REM 70,71,72,73,74,75,76,77
780 REM 71,72,73,74,75,76,77,78
790 REM 72,73,74,75,76,77,78,79
800 REM 73,74,75,76,77,78,79,80
810 REM 74,75,76,77,78,79,80,81
820 REM 75,76,77,78,79,80,81,82
830 REM 76,77,78,79,80,81,82,83
840 REM 77,78,79,80,81,82,83,84
850 REM 78,79,80,81,82,83,84,85
860 REM 79,80,81,82,83,84,85,86
870 REM 80,81,82,83,84,85,86,87
880 REM 81,82,83,84,85,86,87,88
890 REM 82,83,84,85,86,87,88,89
900 REM 83,84,85,86,87,88,89,90
910 REM 84,85,86,87,88,89,90,91
920 REM 85,86,87,88,89,90,91,92
930 REM 86,87,88,89,90,91,92,93
940 REM 87,88,89,90,91,92,93,94
950 REM 88,89,90,91,92,93,94,95
960 REM 89,90,91,92,93,94,95,96
970 REM 90,91,92,93,94,95,96,97
980 REM 91,92,93,94,95,96,97,98
990 REM 92,93,94,95,96,97,98,99
1000 REM 93,94,95,96,97,98,99,100
1010 REM 94,95,96,97,98,99,100,101
1020 REM 95,96,97,98,99,100,101,102
1030 REM 96,97,98,99,100,101,102,103
1040 REM 97,98,99,100,101,102,103,104
1050 REM 98,99,100,101,102,103,104,105
1060 REM 99,100,101,102,103,104,105,106
1070 REM 100,101,102,103,104,105,106,107
1080 REM 101,102,103,104,105,106,107,108
1090 REM 102,103,104,105,106,107,108,109
1100 REM 103,104,105,106,107,108,109,110
1110 REM 104,105,106,107,108,109,110,111
1120 REM 105,106,107,108,109,110,111,112
1130 REM 106,107,108,109,110,111,112,113
1140 REM 107,108,109,110,111,112,113,114
1150 REM 108,109,110,111,112,113,114,115
1160 REM 109,110,111,112,113,114,115,116
1170 REM 110,111,112,113,114,115,116,117
1180 REM 111,112,113,114,115,116,117,118
1190 REM 112,113,114,115,116,117,118,119
1200 REM 113,114,115,116,117,118,119,120
1210 REM 114,115,116,117,118,119,120,121
1220 REM 115,116,117,118,119,120,121,122
1230 REM 116,117,118,119,120,121,122,123
1240 REM 117,118,119,120,121,122,123,124
1250 REM 118,119,120,121,122,123,124,125
1260 REM 119,120,121,122,123,124,125,126
1270 REM 120,121,122,123,124,125,126,127
1280 REM 121,122,123,124,125,126,127,128
1290 REM 122,123,124,125,126,127,128,129
1300 REM 123,124,125,126,127,128,129,130
1310 REM 124,125,126,127,128,129,130,131
1320 REM 125,126,127,128,129,130,131,132
1330 REM 126,127,128,129,130,131,132,133
1340 REM 127,128,129,130,131,132,133,134
1350 REM 128,129,130,131,132,133,134,135
1360 REM 129,130,131,132,133,134,135,136
1370 REM 130,131,132,133,134,135,136,137
1380 REM 131,132,133,134,135,136,137,138
1390 REM 132,133,134,135,136,137,138,139
1400 REM 133,134,135,136,137,138,139,140
1410 REM 134,135,136,137,138,139,140,141
1420 REM 135,136,137,138,139,140,141,142
1430 REM 136,137,138,139,140,141,142,143
1440 REM 137,138,139,140,141,142,143,144
1450 REM 138,139,140,141,142,143,144,145
1460 REM 139,140,141,142,143,144,145,146
1470 REM 140,141,142,143,144,145,146,147
1480 REM 141,142,143,144,145,146,147,148
1490 REM 142,143,144,145,146,147,148,149
1500 REM 143,144,145,146,147,148,149,150
1510 REM 144,145,146,147,148,149,150,151
1520 REM 145,146,147,148,149,150,151,152
1530 REM 146,147,148,149,150,151,152,153
1540 REM 147,148,149,150,151,152,153,154
1550 REM 148,149,150,151,152,153,154,155
1560 REM 149,150,151,152,153,154,155,156
1570 REM 150,151,152,153,154,155,156,157
1580 REM 151,152,153,154,155,156,157,158
1590 REM 152,153,154,155,156,157,158,159
1600 REM 153,154,155,156,157,158,159,160
1610 REM 154,155,156,157,158,159,160,161
1620 REM 155,156,157,158,159,160,161,162
1630 REM 156,157,158,159,160,161,162,163
1640 REM 157,158,159,160,161,162,163,164
1650 REM 158,159,160,161,162,163,164,165
1660 REM 159,160,161,162,163,164,165,166
1670 REM 160,161,162,163,164,165,166,167
1680 REM 161,162,163,164,165,166,167,168
1690 REM 162,163,164,165,166,167,168,169
1700 REM 163,164,165,166,167,168,169,170
1710 REM 164,165,166,167,168,169,170,171
1720 REM 165,166,167,168,169,170,171,172
1730 REM 166,167,168,169,170,171,172,173
1740 REM 167,168,169,170,171,172,173,174
1750 REM 168,169,170,171,172,173,174,175
1760 REM 169,170,171,172,173,174,175,176
1770 REM 170,171,172,173,174,175,176,177
1780 REM 171,172,173,174,175,176,177,178
1790 REM 172,173,174,175,176,177,178,179
1800 REM 173,174,175,176,177,178,179,180
1810 REM 174,175,176,177,178,179,180,181
1820 REM 175,176,177,178,179,180,181,182
1830 REM 176,177,178,179,180,181,182,183
1840 REM 177,178,179,180,181,182,183,184
1850 REM 178,179,180,181,182,183,184,185
1860 REM 179,180,181,182,183,184,185,186
1870 REM 180,181,182,183,184,185,186,187
1880 REM 181,182,183,184,185,186,187,188
1890 REM 182,183,184,185,186,187,188,189
1900 REM 183,184,185,186,187,188,189,190
1910 REM 184,185,186,187,188,189,190,191
1920 REM 185,186,187,188,189,190,191,192
1930 REM 186,187,188,189,190,191,192,193
1940 REM 187,188,189,190,191,192,193,194
1950 REM 188,189,190,191,192,193,194,195
1960 REM 189,190,191,192,193,194,195,196
1970 REM 190,191,192,193,194,195,196,197
1980 REM 191,192,193,194,195,196,197,198
1990 REM 192,193,194,195,196,197,198,199
2000 REM 193,194,195,196,197,198,199,200
2010 REM 194,195,196,197,198,199,200,201
2020 REM 195,196,197,198,199,200,201,202
2030 REM 196,197,198,199,200,201,202,203
2040 REM 197,198,199,200,201,202,203,204
2050 REM 198,199,200,201,202,203,204,205
2060 REM 199,200,201,202,203,204,205,206
2070 REM 200,201,202,203,204,205,206,207
2080 REM 201,202,203,204,205,206,207,208
2090 REM 202,203,204,205,206,207,208,209
2100 REM 203,204,205,206,207,208,209,210
2110 REM 204,205,206,207,208,209,210,211
2120 REM 205,206,207,208,209,210,211,212
2130 REM 206,207,208,209,210,211,212,213
2140 REM 207,208,209,210,211,212,213,214
2150 REM 208,209,210,211,212,213,214,215
2160 REM 209,210,211,212,213,214,215,216
2170 REM 210,211,212,213,214,215,216,217
2180 REM 211,212,213,214,215,216,217,218
2190 REM 212,213,214,215,216,217,218,219
2200 REM 213,214,215,216,217,218,219,220
2210 REM 214,215,216,217,218,219,220,221
2220 REM 215,216,217,218,219,220,221,222
2230 REM 216,217,218,219,220,221,222,223
2240 REM 217,218,219,220,221,222,223,224
2250 REM 218,219,220,221,222,223,224,225
2260 REM 219,220,221,222,223,224,225,226
2270 REM 220,221,222,223,224,225,226,227
2280 REM 221,222,223,224,225,226,227,228
2290 REM 222,223,224,225,226,227,228,229
2300 REM 223,224,225,226,227,228,229,230
2310 REM 224,225,226,227,228,229,230,231
2320 REM 225,226,227,228,229,230,231,232
2330 REM 226,227,228,229,230,231,232,233
2340 REM 227,228,229,230,231,232,233,234
2350 REM 228,229,230,231,232,233,234,235
2360 REM 229,230,231,232,233,234,235,236
2370 REM 230,231,232,233,234,235,236,237
2380 REM 231,232,233,234,235,236,237,238
2390 REM 232,233,234,235,236,237,238,239
2400 REM 233,234,235,236,237,238,239,240
2410 REM 234,235,236,237,238,239,240,241
2420 REM 235,236,237,238,239,240,241,242
2430 REM 236,237,238,239,240,241,242,243
2440 REM 237,238,239,240,241,242,243,244
2450 REM 238,239,240,241,242,243,244,245
2460 REM 239,240,241,242,243,244,245,246
2470 REM 240,241,242,243,244,245,246,247
2480 REM 241,242,243,244,245,246,247,248
2490 REM 242,243,244,245,246,247,248,249
2500 REM 243,244,245,246,247,248,249,250
2510 REM 244,245,246,247,248,249,250,251
2520 REM 245,246,247,248,249,250,251,252
2530 REM 246,247,248,249,250,251,252,253
2540 REM 247,248,249,250,251,252,253,254
2550 REM 248,249,250,251,252,253,254,255
2560 REM 249,250,251,252,253,254,255,256
2570 REM 250,251,252,253,254,255,256,257
2580 REM 251,252,253,254,255,256,257,258
2590 REM 252,253,254,255,256,257,258,259
2600 REM 253,254,255,256,257,258,259,260
2610 REM 254,255,256,257,258,259,260,261
2620 REM 255,256,257,258,259,260,261,262
2630 REM 256,257,258,259,260,261,262,263
2640 REM 257,258,259,260,261,262,263,264
2650 REM 258,259,260,261,262,263,264,265
2660 REM 259,260,261,262,263,264,265,266
2670 REM 260,261,262,263,264,265,266,267
2680 REM 261,262,263,264,265,266,267,268
2690 REM 262,263,264,265,266,267,268,269
2700 REM 263,264,265,266,267,268,269,270
2710 REM 264,265,266,267,268,269,270,271
2720 REM 265,266,267,268,269,270,271,272
2730 REM 266,267,268,269,270,271,272,273
2740 REM 267,268,269,270,271,272,273,274
2750 REM 268,269,270,271,272,273,274,275
2760 REM 269,270,271,272,273,274,275,276
2770 REM 270,271,272,273,274,275,276,277
2780 REM 271,272,273,274,275,276,277,278
2790 REM 272,273,274,275,276,277,278,279
2800 REM 273,274,275,276,277,278,279,280
2810 REM 274,275,276,277,278,279,280,281
2820 REM 275,276,277,278,279,280,281,282
2830 REM 276,277,278,279,280,281,282,283
2840 REM 277,278,279,280,281,282,283,284
2850 REM 278,279,280,281,282,283,284,285
2860 REM 279,280,281,282,283,284,285,286
2870 REM 280,281,282,283,284,285,286,287
2880 REM 281,282,283,284,285,286,287,288
2890 REM 282,283,284,285,286,287,288,289
2900 REM 283,284,285,286,287,288,289,290
2910 REM 284,285,286,287,288,289,290,291
2920 REM 285,286,287,288,289,290,291,292
2930 REM 286,287,288,289,290,291,292,293
2940 REM 287,288,289,290,291,292,293,294
2950 REM 288,289,290,291,292,293,294,295
2960 REM 289,290,291,292,293,294,295,296
2970 REM 290,291,292,293,294,295,296,297
2980 REM 291,292,293,294,295,296,297,298
2990 REM 292,293,294,295,296,297,298,299
3000 REM 293,294,295,296,297,298,299,300
3010 REM 294,295,296,297,298,299,300,301
3020 REM 295,296,297,298,299,300,301,302
3030 REM 296,297,298,299,300,301,302,303
3040 REM 297,298,299,300,301,302,303,304
3050 REM 298,299,300,301,302,303,304,305
3060 REM 299,300,301,302,303,304,305,306
3070 REM 300,301,302,303,304,305,306,307
3080 REM 301,302,303,304,305,306,307,308
3090 REM 302,303,304,305,306,307,308,309
3100 REM 303,304,305,306,307,308,309,310
3110 REM 304,305,306,307,308,309,310,311
3120 REM 305,306,307,308,309,310,311,312
3130 REM 306,307,308,309,310,311,312,313
3140 REM 307,308,309,310,311,312,313,314
3150 REM 308,309,310,311,312,313,314,315
3160 REM 309,310,311,312,313,314,315,316
3170 REM 310,311,312,313,314,315,316,317
3180 REM 311,312,313,314,315,316,317,318
3190 REM 312,313,314,315,316,317,318,319
3200 REM 313,314,315,316,317,318,319,320
3210 REM 314,315,316,317,318,319,320,321
3220 REM 315,316,317,318,319,320,321,322
3230 REM 316,317,318,319,320,321,322,323
3240 REM 317,318,319,320,321,322,323,324
3250 REM 318,319,320,321,322,323,324,325
3260 REM 319,320,321,322,323,324,325,326
3270 REM 320,321,322,323,324,325,326,327
3280 REM 321,322,323,324,325,326,327,328
3290 REM 322,323,324,325,326,327,328,329
3300 REM 323,324,325,326,327,328,329,330
3310 REM 324,325,326,327,328,329,330,331
3320 REM 325,326,327,328,329,330,331,332
3330 REM 326,327,328,329,330,331,332,333
3340 REM 327,328,329,330,331,332,333,334
3350 REM 328,329,330,331,332,333,334,335
3360 REM 329,330,331,332,333,334,335,336
3370 REM 330,331,332,333,334,335,336,337
3380 REM 331,332,333,334,335,336,337,338
3390 REM 332,333,334,335,336,337,338,339
3400 REM 333,33
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Open Forum

Open Forum is for you to publish your programs and ideas.

It is important that your programs are bug free before you send them in. We cannot test all of them.

Contributions should be sent to: Popular Computing Weekly, Hobbies Court,
■ Whitcomb Street, London WC2H 7HF.

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.

The author of that program will qualify for DOUBLE the usual fee we pay for published programs.

(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette.

The program will be well documented, the documentation being typed with a double spacing between each line. The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Primer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing.

Please enclose a stamped, self-addressed envelope.

Code Cracker

on 2X81

Code Cracker is the standard Mastermind game in which the computer generates a code using the numbers 1 to 6. The computer gives clues in the form of the number of blacks or whites you get. Blacks are where you got both the number and position correct, whites are where you got only the number correct.

You have ten guesses for the code after which the code will be revealed. For each attempt you are asked for your guess in the form '1234' or you may enter 'R' to reveal the code and end the game.

Program notes

Lines 10 to 50 set up the main variables.

Lines 60 to 80 set up the random code which you must guess.

Lines 120 to 180 ask for and accept your guess.

Lines 180 to 250 count the number of blacks (score).

Lines 250 to 340 count the number of whites (score).

Lines 350 to 420 decide if you scored four blacks so you ran out of guesses and give the option of another game.

10 LET CS=1111
20 LET QP=1111
30 LET U=CODE 1-6
40 LET N=1
50 LET R=R+1
60 FOR N=U TO E
70 LET CS=CS+STRS (INT IRND4)+
DE 1+U+N
80 NEXT N
90 CLS
100 PRINT TAB R+R [REMOVED]
+TTC HT U+U Q, CODE GOES BLACK
110 FOR N=U TO R+R
120 ?N?4 OH R+R ENTER CODE
130 INPUT GB
140 IF GB=R THEN GOTO 370
150 IF LEN GB<E THEN GOTO 130
160 PRINT HT 20,R+R
3 QJCS TRM 7, STRS N.
170 LET D=M
180 LET U=Q
190 LET D=CS
200 FOR X=U TO E
210 IF GS(X)=D(X) THEN GOTO 2
220 LET L\$=" " 21
230 LET L\$=" " 0"
240 LET D=D+U
250 NEXT X
260 FOR I=U TO E
270 IF GS(I)=D(I) THEN GOTO 2
280 LET D=D+U
290 LET U=U+1
300 NEXT I
310 NEXT X
320 PRINT TAB 14,B,TAB 21,N
330 IF R=I THEN GOTO 350
340 PRINT RT N+R,Q,CODE TCS
350 PRINT RT H+R,M WELL DONE
360 PRINT [REMOVED]
370 INPUT HS
380 IF HS="Y" THEN RUN

Score table

CODE	GOES	BLACK	WHITE
1-2-3-4-5-6	6	0	6
1-2-3-4-6-5	5	2	3
1-2-3-5-6-4	4	3	2
1-2-4-5-6-3	3	1	4
1-2-4-6-5-3	2	2	3
1-2-5-4-6-3	1	3	2
1-3-4-5-6-2	0	4	1

WELL DONE

Open Forum

Accounts

by Vic 20

This program is designed to run on the basic Vic20. The program allows for account data to be read from a cassette tape or for a new set of data to be started.

Once the account data has been read from cassette or the new balance is typed, the user is given the option to display the account on the screen, input new credit or debits, or to stop the program by dumping the account data back on tape. Full use is made of Vic colour and once the program is completed the screen is automatically returned to normal.

The program has prompts to help the user operate the program. The account data held includes either the cheque number involved or a simple explanation of the transaction, the sum involved and the current balance.

If account data has previously been dumped to tape this data can be read into the program. When the program is stopped the closing routine asks for a date to be used on the tape - eg 4TH JUNE or JUNE01.

For added clarity all credit sums are displayed in green and debit sums in red with reverse on. On a black and white TV it is still possible to differentiate which is which by the light or darker shading.

If you are using the program for the first time you set your present account balance, then type in the credit or debit transaction, you then can display the information and/or dump the information to tape.

Due to the basic Vic20 limitation on user available Ram the program is restricted to three pages of account data - 45 entries. This restriction can be overcome if you dump the current data on to cassette, run the program, type in the current balance and then continue. The account is capable of handling any sum up to £1999.99.

When displaying the account if there is no data on the page the user requests the institution is ignored. A lower numbered page must be typed. If there is no data held in the account you cannot display it. You must first type in a credit or a debit and then your data entries. 0 - Account details, N - New, C - Credit and D - Debit whether sums are credits or debits.

Lines 15 to 55 allow it to read data from cassette or user keyboard.

Lines 16 to 20 Program is now complete and the user is asked what he wants to do (see 542 to 582). Lines 2000 to 2010 this is the routine for accepting credit/debit data into the account program. Traps are provided to ensure the cheque number or entry equals 8 characters and that only C or D or CR for credit is typed.

Lines 2700 to 2950 calculation of the credit or debit

to next page

Accounts
by Keith Hall

```
5 DIM DATA(1) 1440,25,CBS(46),P01C36879,155
15 PRINT"DEPARTMENTAL ACCOUNT PROGRAM"
16 PRINT"DATA = DATA FROM .HDF"
20 PRINT#1002 = RESET + LINE1
24 PRINT"INSTRUMENT TO BE AT START"
25 EX = INPUT"ENTER INSTRUMENT NO"
29 INPUT"TYPE BALANCE" B$H00T0100
24 11=1200,1100,1110
35 OPEN#1,0,18
40 PRINT"MEANING" "0"
45 T0R=(T0T5 INPUT#1,0,R,I,BE(R),L0V,T0R)
48 T0T6=T0T5 INPUT#1,0,R,I,D0V,T0R
52 T0T7=T0T5 INPUT#1,0,R,I,D0V,T0R
55 T0T8=T0T5 INPUT#1,0,R,I,D0V,T0R
58 T0T9=T0T5 INPUT#1,0,R,I,D0V,T0R
61 T0T10=T0T5 INPUT#1,0,R,I,D0V,T0R
64 T0T11=T0T5 INPUT#1,0,R,I,D0V,T0R
67 T0T12=T0T5 INPUT#1,0,R,I,D0V,T0R
70 T0T13=T0T5 INPUT#1,0,R,I,D0V,T0R
73 T0T14=T0T5 INPUT#1,0,R,I,D0V,T0R
76 T0T15=T0T5 INPUT#1,0,R,I,D0V,T0R
79 T0T16=T0T5 INPUT#1,0,R,I,D0V,T0R
82 T0T17=T0T5 INPUT#1,0,R,I,D0V,T0R
85 T0T18=T0T5 INPUT#1,0,R,I,D0V,T0R
88 T0T19=T0T5 INPUT#1,0,R,I,D0V,T0R
91 T0T20=T0T5 INPUT#1,0,R,I,D0V,T0R
94 T0T21=T0T5 INPUT#1,0,R,I,D0V,T0R
97 T0T22=T0T5 INPUT#1,0,R,I,D0V,T0R
100 T0T23=T0T5 INPUT#1,0,R,I,D0V,T0R
103 T0T24=T0T5 INPUT#1,0,R,I,D0V,T0R
106 T0T25=T0T5 INPUT#1,0,R,I,D0V,T0R
109 T0T26=T0T5 INPUT#1,0,R,I,D0V,T0R
112 T0T27=T0T5 INPUT#1,0,R,I,D0V,T0R
115 T0T28=T0T5 INPUT#1,0,R,I,D0V,T0R
118 T0T29=T0T5 INPUT#1,0,R,I,D0V,T0R
121 T0T30=T0T5 INPUT#1,0,R,I,D0V,T0R
124 T0T31=T0T5 INPUT#1,0,R,I,D0V,T0R
127 T0T32=T0T5 INPUT#1,0,R,I,D0V,T0R
130 T0T33=T0T5 INPUT#1,0,R,I,D0V,T0R
133 T0T34=T0T5 INPUT#1,0,R,I,D0V,T0R
136 T0T35=T0T5 INPUT#1,0,R,I,D0V,T0R
139 T0T36=T0T5 INPUT#1,0,R,I,D0V,T0R
142 T0T37=T0T5 INPUT#1,0,R,I,D0V,T0R
145 T0T38=T0T5 INPUT#1,0,R,I,D0V,T0R
148 T0T39=T0T5 INPUT#1,0,R,I,D0V,T0R
151 T0T40=T0T5 INPUT#1,0,R,I,D0V,T0R
154 T0T41=T0T5 INPUT#1,0,R,I,D0V,T0R
157 T0T42=T0T5 INPUT#1,0,R,I,D0V,T0R
160 T0T43=T0T5 INPUT#1,0,R,I,D0V,T0R
163 T0T44=T0T5 INPUT#1,0,R,I,D0V,T0R
166 T0T45=T0T5 INPUT#1,0,R,I,D0V,T0R
169 T0T46=T0T5 INPUT#1,0,R,I,D0V,T0R
172 T0T47=T0T5 INPUT#1,0,R,I,D0V,T0R
175 T0T48=T0T5 INPUT#1,0,R,I,D0V,T0R
178 T0T49=T0T5 INPUT#1,0,R,I,D0V,T0R
181 T0T50=T0T5 INPUT#1,0,R,I,D0V,T0R
184 T0T51=T0T5 INPUT#1,0,R,I,D0V,T0R
187 T0T52=T0T5 INPUT#1,0,R,I,D0V,T0R
190 T0T53=T0T5 INPUT#1,0,R,I,D0V,T0R
193 T0T54=T0T5 INPUT#1,0,R,I,D0V,T0R
196 T0T55=T0T5 INPUT#1,0,R,I,D0V,T0R
199 T0T56=T0T5 INPUT#1,0,R,I,D0V,T0R
202 T0T57=T0T5 INPUT#1,0,R,I,D0V,T0R
205 T0T58=T0T5 INPUT#1,0,R,I,D0V,T0R
208 T0T59=T0T5 INPUT#1,0,R,I,D0V,T0R
211 T0T60=T0T5 INPUT#1,0,R,I,D0V,T0R
214 T0T61=T0T5 INPUT#1,0,R,I,D0V,T0R
217 T0T62=T0T5 INPUT#1,0,R,I,D0V,T0R
220 T0T63=T0T5 INPUT#1,0,R,I,D0V,T0R
223 T0T64=T0T5 INPUT#1,0,R,I,D0V,T0R
226 T0T65=T0T5 INPUT#1,0,R,I,D0V,T0R
229 T0T66=T0T5 INPUT#1,0,R,I,D0V,T0R
232 T0T67=T0T5 INPUT#1,0,R,I,D0V,T0R
235 T0T68=T0T5 INPUT#1,0,R,I,D0V,T0R
238 T0T69=T0T5 INPUT#1,0,R,I,D0V,T0R
241 T0T70=T0T5 INPUT#1,0,R,I,D0V,T0R
244 T0T71=T0T5 INPUT#1,0,R,I,D0V,T0R
247 T0T72=T0T5 INPUT#1,0,R,I,D0V,T0R
250 T0T73=T0T5 INPUT#1,0,R,I,D0V,T0R
253 T0T74=T0T5 INPUT#1,0,R,I,D0V,T0R
256 T0T75=T0T5 INPUT#1,0,R,I,D0V,T0R
259 T0T76=T0T5 INPUT#1,0,R,I,D0V,T0R
262 T0T77=T0T5 INPUT#1,0,R,I,D0V,T0R
265 T0T78=T0T5 INPUT#1,0,R,I,D0V,T0R
268 T0T79=T0T5 INPUT#1,0,R,I,D0V,T0R
271 T0T80=T0T5 INPUT#1,0,R,I,D0V,T0R
274 T0T81=T0T5 INPUT#1,0,R,I,D0V,T0R
277 T0T82=T0T5 INPUT#1,0,R,I,D0V,T0R
280 T0T83=T0T5 INPUT#1,0,R,I,D0V,T0R
283 T0T84=T0T5 INPUT#1,0,R,I,D0V,T0R
286 T0T85=T0T5 INPUT#1,0,R,I,D0V,T0R
289 T0T86=T0T5 INPUT#1,0,R,I,D0V,T0R
292 T0T87=T0T5 INPUT#1,0,R,I,D0V,T0R
295 T0T88=T0T5 INPUT#1,0,R,I,D0V,T0R
298 T0T89=T0T5 INPUT#1,0,R,I,D0V,T0R
301 T0T90=T0T5 INPUT#1,0,R,I,D0V,T0R
304 T0T91=T0T5 INPUT#1,0,R,I,D0V,T0R
307 T0T92=T0T5 INPUT#1,0,R,I,D0V,T0R
310 T0T93=T0T5 INPUT#1,0,R,I,D0V,T0R
313 T0T94=T0T5 INPUT#1,0,R,I,D0V,T0R
316 T0T95=T0T5 INPUT#1,0,R,I,D0V,T0R
319 T0T96=T0T5 INPUT#1,0,R,I,D0V,T0R
322 T0T97=T0T5 INPUT#1,0,R,I,D0V,T0R
325 T0T98=T0T5 INPUT#1,0,R,I,D0V,T0R
328 T0T99=T0T5 INPUT#1,0,R,I,D0V,T0R
331 T0T100=T0T5 INPUT#1,0,R,I,D0V,T0R
334 T0T101=T0T5 INPUT#1,0,R,I,D0V,T0R
337 T0T102=T0T5 INPUT#1,0,R,I,D0V,T0R
340 T0T103=T0T5 INPUT#1,0,R,I,D0V,T0R
343 T0T104=T0T5 INPUT#1,0,R,I,D0V,T0R
346 T0T105=T0T5 INPUT#1,0,R,I,D0V,T0R
349 T0T106=T0T5 INPUT#1,0,R,I,D0V,T0R
352 T0T107=T0T5 INPUT#1,0,R,I,D0V,T0R
355 T0T108=T0T5 INPUT#1,0,R,I,D0V,T0R
358 T0T109=T0T5 INPUT#1,0,R,I,D0V,T0R
361 T0T110=T0T5 INPUT#1,0,R,I,D0V,T0R
364 T0T111=T0T5 INPUT#1,0,R,I,D0V,T0R
367 T0T112=T0T5 INPUT#1,0,R,I,D0V,T0R
370 T0T113=T0T5 INPUT#1,0,R,I,D0V,T0R
373 T0T114=T0T5 INPUT#1,0,R,I,D0V,T0R
376 T0T115=T0T5 INPUT#1,0,R,I,D0V,T0R
379 T0T116=T0T5 INPUT#1,0,R,I,D0V,T0R
382 T0T117=T0T5 INPUT#1,0,R,I,D0V,T0R
385 T0T118=T0T5 INPUT#1,0,R,I,D0V,T0R
388 T0T119=T0T5 INPUT#1,0,R,I,D0V,T0R
391 T0T120=T0T5 INPUT#1,0,R,I,D0V,T0R
394 T0T121=T0T5 INPUT#1,0,R,I,D0V,T0R
397 T0T122=T0T5 INPUT#1,0,R,I,D0V,T0R
400 T0T123=T0T5 INPUT#1,0,R,I,D0V,T0R
403 T0T124=T0T5 INPUT#1,0,R,I,D0V,T0R
406 T0T125=T0T5 INPUT#1,0,R,I,D0V,T0R
409 T0T126=T0T5 INPUT#1,0,R,I,D0V,T0R
412 T0T127=T0T5 INPUT#1,0,R,I,D0V,T0R
415 T0T128=T0T5 INPUT#1,0,R,I,D0V,T0R
418 T0T129=T0T5 INPUT#1,0,R,I,D0V,T0R
421 T0T130=T0T5 INPUT#1,0,R,I,D0V,T0R
424 T0T131=T0T5 INPUT#1,0,R,I,D0V,T0R
427 T0T132=T0T5 INPUT#1,0,R,I,D0V,T0R
430 T0T133=T0T5 INPUT#1,0,R,I,D0V,T0R
433 T0T134=T0T5 INPUT#1,0,R,I,D0V,T0R
436 T0T135=T0T5 INPUT#1,0,R,I,D0V,T0R
439 T0T136=T0T5 INPUT#1,0,R,I,D0V,T0R
442 T0T137=T0T5 INPUT#1,0,R,I,D0V,T0R
445 T0T138=T0T5 INPUT#1,0,R,I,D0V,T0R
448 T0T139=T0T5 INPUT#1,0,R,I,D0V,T0R
451 T0T140=T0T5 INPUT#1,0,R,I,D0V,T0R
454 T0T141=T0T5 INPUT#1,0,R,I,D0V,T0R
457 T0T142=T0T5 INPUT#1,0,R,I,D0V,T0R
460 T0T143=T0T5 INPUT#1,0,R,I,D0V,T0R
463 T0T144=T0T5 INPUT#1,0,R,I,D0V,T0R
466 T0T145=T0T5 INPUT#1,0,R,I,D0V,T0R
469 T0T146=T0T5 INPUT#1,0,R,I,D0V,T0R
472 T0T147=T0T5 INPUT#1,0,R,I,D0V,T0R
475 T0T148=T0T5 INPUT#1,0,R,I,D0V,T0R
478 T0T149=T0T5 INPUT#1,0,R,I,D0V,T0R
481 T0T150=T0T5 INPUT#1,0,R,I,D0V,T0R
484 T0T151=T0T5 INPUT#1,0,R,I,D0V,T0R
487 T0T152=T0T5 INPUT#1,0,R,I,D0V,T0R
490 T0T153=T0T5 INPUT#1,0,R,I,D0V,T0R
493 T0T154=T0T5 INPUT#1,0,R,I,D0V,T0R
496 T0T155=T0T5 INPUT#1,0,R,I,D0V,T0R
499 T0T156=T0T5 INPUT#1,0,R,I,D0V,T0R
502 T0T157=T0T5 INPUT#1,0,R,I,D0V,T0R
505 T0T158=T0T5 INPUT#1,0,R,I,D0V,T0R
508 T0T159=T0T5 INPUT#1,0,R,I,D0V,T0R
511 T0T160=T0T5 INPUT#1,0,R,I,D0V,T0R
514 T0T161=T0T5 INPUT#1,0,R,I,D0V,T0R
517 T0T162=T0T5 INPUT#1,0,R,I,D0V,T0R
520 T0T163=T0T5 INPUT#1,0,R,I,D0V,T0R
523 T0T164=T0T5 INPUT#1,0,R,I,D0V,T0R
526 T0T165=T0T5 INPUT#1,0,R,I,D0V,T0R
529 T0T166=T0T5 INPUT#1,0,R,I,D0V,T0R
532 T0T167=T0T5 INPUT#1,0,R,I,D0V,T0R
535 T0T168=T0T5 INPUT#1,0,R,I,D0V,T0R
538 T0T169=T0T5 INPUT#1,0,R,I,D0V,T0R
541 T0T170=T0T5 INPUT#1,0,R,I,D0V,T0R
544 T0T171=T0T5 INPUT#1,0,R,I,D0V,T0R
547 T0T172=T0T5 INPUT#1,0,R,I,D0V,T0R
550 T0T173=T0T5 INPUT#1,0,R,I,D0V,T0R
553 T0T174=T0T5 INPUT#1,0,R,I,D0V,T0R
556 T0T175=T0T5 INPUT#1,0,R,I,D0V,T0R
559 T0T176=T0T5 INPUT#1,0,R,I,D0V,T0R
562 T0T177=T0T5 INPUT#1,0,R,I,D0V,T0R
565 T0T178=T0T5 INPUT#1,0,R,I,D0V,T0R
568 T0T179=T0T5 INPUT#1,0,R,I,D0V,T0R
571 T0T180=T0T5 INPUT#1,0,R,I,D0V,T0R
574 T0T181=T0T5 INPUT#1,0,R,I,D0V,T0R
577 T0T182=T0T5 INPUT#1,0,R,I,D0V,T0R
580 T0T183=T0T5 INPUT#1,0,R,I,D0V,T0R
583 T0T184=T0T5 INPUT#1,0,R,I,D0V,T0R
586 T0T185=T0T5 INPUT#1,0,R,I,D0V,T0R
589 T0T186=T0T5 INPUT#1,0,R,I,D0V,T0R
592 T0T187=T0T5 INPUT#1,0,R,I,D0V,T0R
595 T0T188=T0T5 INPUT#1,0,R,I,D0V,T0R
598 T0T189=T0T5 INPUT#1,0,R,I,D0V,T0R
601 T0T190=T0T5 INPUT#1,0,R,I,D0V,T0R
604 T0T191=T0T5 INPUT#1,0,R,I,D0V,T0R
607 T0T192=T0T5 INPUT#1,0,R,I,D0V,T0R
610 T0T193=T0T5 INPUT#1,0,R,I,D0V,T0R
613 T0T194=T0T5 INPUT#1,0,R,I,D0V,T0R
616 T0T195=T0T5 INPUT#1,0,R,I,D0V,T0R
619 T0T196=T0T5 INPUT#1,0,R,I,D0V,T0R
622 T0T197=T0T5 INPUT#1,0,R,I,D0V,T0R
625 T0T198=T0T5 INPUT#1,0,R,I,D0V,T0R
628 T0T199=T0T5 INPUT#1,0,R,I,D0V,T0R
631 T0T200=T0T5 INPUT#1,0,R,I,D0V,T0R
634 T0T201=T0T5 INPUT#1,0,R,I,D0V,T0R
637 T0T202=T0T5 INPUT#1,0,R,I,D0V,T0R
640 T0T203=T0T5 INPUT#1,0,R,I,D0V,T0R
643 T0T204=T0T5 INPUT#1,0,R,I,D0V,T0R
646 T0T205=T0T5 INPUT#1,0,R,I,D0V,T0R
649 T0T206=T0T5 INPUT#1,0,R,I,D0V,T0R
652 T0T207=T0T5 INPUT#1,0,R,I,D0V,T0R
655 T0T208=T0T5 INPUT#1,0,R,I,D0V,T0R
658 T0T209=T0T5 INPUT#1,0,R,I,D0V,T0R
661 T0T210=T0T5 INPUT#1,0,R,I,D0V,T0R
664 T0T211=T0T5 INPUT#1,0,R,I,D0V,T0R
667 T0T212=T0T5 INPUT#1,0,R,I,D0V,T0R
670 T0T213=T0T5 INPUT#1,0,R,I,D0V,T0R
673 T0T214=T0T5 INPUT#1,0,R,I,D0V,T0R
676 T0T215=T0T5 INPUT#1,0,R,I,D0V,T0R
679 T0T216=T0T5 INPUT#1,0,R,I,D0V,T0R
682 T0T217=T0T5 INPUT#1,0,R,I,D0V,T0R
685 T0T218=T0T5 INPUT#1,0,R,I,D0V,T0R
688 T0T219=T0T5 INPUT#1,0,R,I,D0V,T0R
691 T0T220=T0T5 INPUT#1,0,R,I,D0V,T0R
694 T0T221=T0T5 INPUT#1,0,R,I,D0V,T0R
697 T0T222=T0T5 INPUT#1,0,R,I,D0V,T0R
700 T0T223=T0T5 INPUT#1,0,R,I,D0V,T0R
703 T0T224=T0T5 INPUT#1,0,R,I,D0V,T0R
706 T0T225=T0T5 INPUT#1,0,R,I,D0V,T0R
709 T0T226=T0T5 INPUT#1,0,R,I,D0V,T0R
712 T0T227=T0T5 INPUT#1,0,R,I,D0V,T0R
715 T0T228=T0T5 INPUT#1,0,R,I,D0V,T0R
718 T0T229=T0T5 INPUT#1,0,R,I,D0V,T0R
721 T0T230=T0T5 INPUT#1,0,R,I,D0V,T0R
724 T0T231=T0T5 INPUT#1,0,R,I,D0V,T0R
727 T0T232=T0T5 INPUT#1,0,R,I,D0V,T0R
730 T0T233=T0T5 INPUT#1,0,R,I,D0V,T0R
733 T0T234=T0T5 INPUT#1,0,R,I,D0V,T0R
736 T0T235=T0T5 INPUT#1,0,R,I,D0V,T0R
739 T0T236=T0T5 INPUT#1,0,R,I,D0V,T0R
742 T0T237=T0T5 INPUT#1,0,R,I,D0V,T0R
745 T0T238=T0T5 INPUT#1,0,R,I,D0V,T0R
748 T0T239=T0T5 INPUT#1,0,R,I,D0V,T0R
751 T0T240=T0T5 INPUT#1,0,R,I,D0V,T0R
754 T0T241=T0T5 INPUT#1,0,R,I,D0V,T0R
757 T0T242=T0T5 INPUT#1,0,R,I,D0V,T0R
760 T0T243=T0T5 INPUT#1,0,R,I,D0V,T0R
763 T0T244=T0T5 INPUT#1,0,R,I,D0V,T0R
766 T0T245=T0T5 INPUT#1,0,R,I,D0V,T0R
769 T0T246=T0T5 INPUT#1,0,R,I,D0V,T0R
772 T0T247=T0T5 INPUT#1,0,R,I,D0V,T0R
775 T0T248=T0T5 INPUT#1,0,R,I,D0V,T0R
778 T0T249=T0T5 INPUT#1,0,R,I,D0V,T0R
781 T0T250=T0T5 INPUT#1,0,R,I,D0V,T0R
784 T0T251=T0T5 INPUT#1,0,R,I,D0V,T0R
787 T0T252=T0T5 INPUT#1,0,R,I,D0V,T0R
790 T0T253=T0T5 INPUT#1,0,R,I,D0V,T0R
793 T0T254=T0T5 INPUT#1,0,R,I,D0V,T0R
796 T0T255=T0T5 INPUT#1,0,R,I,D0V,T0R
800 T0T256=T0T5 INPUT#1,0,R,I,D0V,T0R
803 T0T257=T0T5 INPUT#1,0,R,I,D0V,T0R
806 T0T258=T0T5 INPUT#1,0,R,I,D0V,T0R
809 T0T259=T0T5 INPUT#1,0,R,I,D0V,T0R
812 T0T260=T0T5 INPUT#1,0,R,I,D0V,T0R
815 T0T261=T0T5 INPUT#1,0,R,I,D0V,T0R
818 T0T262=T0T5 INPUT#1,0,R,I,D0V,T0R
821 T0T263=T0T5 INPUT#1,0,R,I,D0V,T0R
824 T0T264=T0T5 INPUT#1,0,R,I,D0V,T0R
827 T0T265=T0T5 INPUT#1,0,R,I,D0V,T0R
830 T0T266=T0T5 INPUT#1,0,R,I,D0V,T0R
833 T0T267=T0T5 INPUT#1,0,R,I,D0V,T0R
836 T0T268=T0T5 INPUT#1,0,R,I,D0V,T0R
839 T0T269=T0T5 INPUT#1,0,R,I,D0V,T0R
842 T0T270=T0T5 INPUT#1,0,R,I,D0V,T0R
845 T0T271=T0T5 INPUT#1,0,R,I,D0V,T0R
848 T0T272=T0T5 INPUT#1,0,R,I,D0V,T0R
851 T0T273=T0T5 INPUT#1,0,R,I,D0V,T0R
854 T0T274=T0T5 INPUT#1,0,R,I,D0V,T0R
857 T0T275=T0T5 INPUT#1,0,R,I,D0V,T0R
860 T0T276=T0T5 INPUT#1,0,R,I,D0V,T0R
863 T0T277=T0T5 INPUT#1,0,R,I,D0V,T0R
866 T0T278=T0T5 INPUT#1,0,R,I,D0V,T0R
869 T0T279=T0T5 INPUT#1,0,R,I,D0V,T0R
872 T0T280=T0T5 INPUT#1,0,R,I,D0V,T0R
875 T0T281=T0T5 INPUT#1,0,R,I,D0V,T0R
878 T0T282=T0T5 INPUT#1,0,R,I,D0V,T0R
881 T0T283=T0T5 INPUT#1,0,R,I,D0V,T0R
884 T0T284=T0T5 INPUT#1,0,R,I,D0V,T0R
887 T0T285=T0T5 INPUT#1,0,R,I,D0V,T0R
890 T0T286=T0T5 INPUT#1,0,R,I,D0V,T0R
893 T0T287=T0T5 INPUT#1,0,R,I,D0V,T0R
896 T0T288=T0T5 INPUT#1,0,R,I,D0V,T0R
899 T0T289=T0T5 INPUT#1,0,R,I,D0V,T0R
902 T0T290=T0T5 INPUT#1,0,R,I,D0V,T0R
905 T0T291=T0T5 INPUT#1,0,R,I,D0V,T0R
908 T0T292=T0T5 INPUT#1,0,R,I,D0V,T0R
911 T0T293=T0T5 INPUT#1,0,R,I,D0V,T0R
914 T0T294=T0T5 INPUT#1,0,R,I,D0V,T0R
917 T0T295=T0T5 INPUT#1,0,R,I,D0V,T0R
920 T0T296=T0T5 INPUT#1,0,R,I,D0V,T0R
923 T0T297=T0T5 INPUT#1,0,R,I,D0V,T0R
926 T0T298=T0T5 INPUT#1,0,R,I,D0V,T0R
929 T0T299=T0T5 INPUT#1,0,R,I,D0V,T0R
932 T0T300=T0T5 INPUT#1,0,R,I,D0V,T0R
935 T0T301=T0T5 INPUT#1,0,R,I,D0V,T0R
938 T0T302=T0T5 INPUT#1,0,R,I,D0V,T0R
941 T0T303=T0T5 INPUT#1,0,R,I,D0V,T0R
944 T0T304=T0T5 INPUT#1,0,R,I,D0V,T0R
947 T0T305=T0T5 INPUT#1,0,R,I,D0V,T0R
950 T0T306=T0T5 INPUT#1,0,R,I,D0V,T0R
953 T0T307=T0T5 INPUT#1,0,R,I,D0V,T0R
956 T0T308=T0T5 INPUT#1,0,R,I,D0V,T0R
959 T0T309=T0T5 INPUT#1,0,R,I,D0V,T0R
962 T0T310=T0T5 INPUT#1,0,R,I,D0V,T0R
965 T0T311=T0T5 INPUT#1,0,R,I,D0V,T0R
968 T0T312=T0T5 INPUT#1,0,R,I,D0V,T0R
971 T0T313=T0T5 INPUT#1,0,R,I,D0V,T0R
974 T0T314=T0T5 INPUT#1,0,R,I,D0V,T0R
977 T0T315=T0T5 INPUT#1,0,R,I,D0V,T0R
980 T0T316=T0T5 INPUT#1,0,R,I,D0V,T0R
983 T0T317=T0T5 INPUT#1,0,R,I,D0V,T0R
986 T0T318=T0T5 INPUT#1,0,R,I,D0V,T0R
989 T0T319=T0T5 INPUT#1,0,R,I,D0V,T0R
992 T0T320=T0T5 INPUT#1,0,R,I,D0V,T0R
995 T0T321=T0T5 INPUT#1,0,R,I,D0V,T0R
998 T0T322=T0T5 INPUT#1,0,R,I,D0V,T0R
1001 T0T323=T0T5 INPUT#1,0,R,I,D0V,T0R
1004 T0T324=T0T5 INPUT#1,0,R,I,D0V,T0R
1007 T0T325=T0T5 INPUT#1,0,R,I,D0V,T0R
1010 T0T326=T0T5 INPUT#1,0,R,I,D0V,T0R
1013 T0T327=T0T5 INPUT#1,0,R,I,D0V,T0R
1016 T0T328=T0T5 INPUT#1,0,R,I,D0V,T0R
1019 T0T329=T0T5 INPUT#1,0,R,I,D0V,T0R
1022 T0T330=T0T5 INPUT#1,0,R,I,D0V,T0R
1025 T0T331=T0T5 INPUT#1,0,R,I,D0V,T0R
1028 T0T332=T0T5 INPUT#1,0,R,I,D0V,T0R
1031 T0T333=T0T5 INPUT#1,0,R,I,D0V,T0R
1034 T0T334=T0T5 INPUT#1,0,R,I,D0V,T0R
1037 T0T335=T0T5 INPUT#1,0,R,I,D0V,T0R
1040 T0T336=T0T5 INPUT#1,0,R,I,D0V,T0R
1043 T0T337=T0T5 INPUT#1,0,R,I,D0V,T0R
1046 T0T338=T0T5 INPUT#1,0,R,I,D0V,T0R
1049 T0T339=T0T5 INPUT#1,0,R,I,D0V,T0R
1052 T0T340=T0T5 INPUT#1,0,R,I,D0V,T0R
1055 T0T341=T0T5 INPUT#1,0,R,I,D0V,T0R
1058 T0T342=T0T5 INPUT#1,0,R,I,D0V,T0R
1061 T0T343=T0T5 INPUT#1,0,R,I,D0V,T0R
1064 T0T344=T0T5 INPUT#1,0,R,I,D0V,T0R
1067 T0T345=T0T5 INPUT#1,0,R,I,D0V,T0R
1070 T0T346=T0T5 INPUT#1,0,R,I,D0V,T0R
1073 T0T347=T0T5 INPUT#1,0,R,I,D0V,T0R
1076 T0T348=T0T5 INPUT#1,0,R,I,D0V,T0R
1079 T0T349=T0T5 INPUT#1,0,R,I,D0V,T0R
1082 T0T350=T0T5 INPUT#1,0,R,I,D0V,T0R
1085 T0T351=T0T5 INPUT#1,0,R,I,D0V,T0R
1088 T0T352=T0T5 INPUT#1,0,R,I,D0V,T0R
1091 T0T353=T0T5 INPUT#1,0,R,I,D0V,T0R
1094 T0T354=T0T5 INPUT#1,0,R,I,D0V,T0R
1097 T0T355=T0T5 INPUT#1,0,R,I,D0V,T0R
1100 T0T356=T0T5 INPUT#1,0,R,I,D0V,T0R
1103 T0T357=T0T5 INPUT#1,0,R,I,D0V,T0R
1106 T0T358=T0T5 INPUT#1,0,R,I,D0V,T0R
1109 T0T359=T0T5 INPUT#1,0,R,I,D0V,T0R
1112 T0T360=T0T5 INPUT#1,0,R,I,D0V,T0R
1115 T0T361=T0T5 INPUT#1,0,R,I,D0V,T0R
1118 T0T362=T0T5 INPUT#1,0,R,I,D0V,T0R
1121 T0T363=T0T5 INPUT#1,0,R,I,D0V,T0R
1124 T0T364=T0T5 INPUT#1,0,R,I,D0V,T0R
1127 T0T365=T0T5 INPUT#1,0,R,I,D0V,T0R
1130 T0T366=T0T5 INPUT#1,0,R,I,D0V,T0R
1133 T0T367=T0T5 INPUT#1,0,R,I,D0V,T0R
1136 T0T368=T0T5 INPUT#1,0,R,I,D0V,T0R
1139 T0T369=T0T5 INPUT#1,0,R,I,D0V,T0R
1142 T0T370=T0T5 INPUT#1,0,R,I,D0V,T0R
1145 T0T371=T0T5 INPUT#1,0,R,I,D0V,T0R
1148 T0T372=T0T5 INPUT#1,0,R,I,D0V,T0R
1151 T0T373=T0T5 INPUT#1,0,R,I,D0V,T0R
1154 T0T374=T0T5 INPUT#1,0,R,I,D0V,T0R
1157 T0T375=T0T5 INPUT#1,0,R,I,D0V,T0R
1160 T0T376=T0T5 INPUT#1,0,R,I,D0V,T0R
1163 T0T377=T0T5 INPUT#1,0,R,I,D0V,T0R
1166 T0T378=T0T5 INPUT#1,0,R,I,D0V,T0R
1169 T0T379=T0T5 INPUT#1,0,R,I,D0V,T0R
1172 T0T380=T0T5 INPUT#1,0,R,I,D0V,T0R
1175 T0T381=T0T5 INPUT#1,0,R,I,D0V,T0R
1178 T0T382=T0T5 INPUT#1,0,R,I,D0V,T0R
1181 T0T383=T0T5 INPUT#1,0,R,I,D0V,T0R
1184 T0T384=T0T5 INPUT#1,0,R,I,D0V,T0R
1187 T0T385=T0T5 INPUT#1,0,R,I,D0V,T0R
1190 T0T386=T0T5 INPUT#1,0,R,I,D0V,T0R
1193 T0T387=T0T5 INPUT#1,0,R,I,D0V,T0R
1196 T0T388=T0T5 INPUT#1,0,R,I,D0V,T0R
1199 T0T389=T0T5 INPUT#1,0,R,I,D0V,T0R
1202 T0T390=T0T5 INPUT#1,0,R,I,D0V,T0R
1205 T0T391=T0T5 INPUT#1,0,R,I,D0V,T0R
1208 T0T392=T0T5 INPUT#1,0,R,I,D0V,T0R
1211 T0T393=T0T5 INPUT#1,0,R,I,D0V,T0R
1214 T0T394=T0T5 INPUT#1,0,R,I,D0V,T0R
1217 T0T395=T0T5 INPUT#1,0,R,I,D0V,T0R
1220 T0T396=T0T5 INPUT#1,0,R,I,D0V,T0R
1223 T0T397=T0T5 INPUT#1,0,R,I,D0V,T0R
1226 T0T398=T0T5 INPUT#1,0,R,I,D0V,T0R
1229 T0T399=T0T5 INPUT#1,0,R,I,D0V,T0R
1232 T0T400=T0T5 INPUT#1,0,R,I,D0V,T0R
1235 T0T401=T0T5 INPUT#1,0,R,I,D0V,T0R
1238 T0T402=T0T5 INPUT#1,0,R,I,D0V,T0R
1241 T0T403=T0T5 INPUT#1,0,R,I,D0V,T0R
1244 T0T404=T0T5 INPUT#1,0,R,I,D0V,T0R
1247 T0T405=T0T5 INPUT#1,0,R,I,D0V,T0R
1250 T0T406=T0T5 INPUT#1,0,R,I,D0V,T0R
1253 T0T407=T0T5 INPUT#1,0,R,I,D0V,T0R
1256 T0T408=T0T5 INPUT#1,0,R,I,D0V,T0R
1259 T0T409=T0T5 INPUT#1,0,R,I,D0V,T0R
1262 T0T410=T0T5 INPUT#1,0,R,I,D0V,T0R
1265 T0T411=T0T5 INPUT#1,0,R,I,D0V,T0R
1268 T0T412=T0T5 INPUT#1,0,R,I,D0V,T0R
1271 T0T413=T0T5 INPUT#1,0,R,I,D0V,T0R
1274 T0T414=T0T5 INPUT#1,0,R,I,D0V,T0R
1277 T0T415=T0T5 INPUT#1,0,R,I,D0V,T0R
1280 T0T416=T0T5 INPUT#1,0,R,I,D0V,T0R
1283 T0T4
```

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and the placing of the data into the correct position in the arrays. Finally the `WAVE` is issued if there are no errors.

Lines 3860-3865: Pseudo-random numbers for displaying the account number in the current page, setting the check digit in front of given bank numbers or bank codes in. Add 12 pseudo-random numbers for ensuring that a bank code is displayed with the decimal points in the one and two digits.

Running 80998 to 99-13. Routine for exiting the program and saving the account data file to disk. The user is prompted to enter the filename to be used.

Line 0008 Statement used to connect phisical links

• The 1990s saw significant improvements in quality.

The National Safety Council PhotoFind® #10200000

48952
Edu O. Nodine, attorney, 1 page - 15 words. Attorney
has no file number or pages 415 - 1 thru 420 contains
nothing.

Line 45-78 should the numbers to equal entry into Line 2640 so should be renumbered to reflect a better

Line 4000b 3 - changed to the number of pages required

ABN 4329 went into the author of legal
negotiations with him - should be numbered by 15 1467
line 11 page four (1) - 46

Keyboard Beeper

on Viplex Zinc

This short machine code subroutine will make a short beep every time a key is pressed. This is useful when both speech and the subroutine also debounce's the keyboard. The first listing is an assembly language listing of the program while the second is a BASIC listing which can be typed in directly.

First I will give an explanation of the assembly language listing. Lines 300 to 700 change the keyboard driver pointer so that it now points to the beeper subroutine. This means that every time the computer wants to know if a key has been pressed it will jump into the beeper subroutine.

Lines 800 to 2100 search through eight bytes and checks to see if any of them contain a value other than zero. If it is found that one of them does contain a value other than zero then it signifies that a key has been pressed and control is passed on to line 2200.

The last section of the program makes the actual sound box. The reason it is so short is because it uses a call to ROM line 2300. This call is usually only made when writing data to the cassette port since the sound box uses the same channels as the cassette, the ROM call can also be used to write sound.

The only thing that needs to be said about the Basic listing is that the memory size does not have to be set since the program does it by itself. The data value in line 60 can be changed to alter the length of the beep.

Keyboard Blesper by Roy Gardner

Open Forum

Torpedo

by ZX81

Torpedo is a fast-moving graphic game which occupies less than 4K of the expanded ZX81. The idea of the game is to torpedo as many of the 15 ships as possible as they move across the top of the screen at different speeds.

You control the torpedo base at the bottom of the screen on the seabed and can move it to the left and right with the 2 and 4 keys. To fire a torpedo press B. Make sure you don't waste your torpedoes as you only have one for each ship.

One feature of the program is the full 24-line display. This is achieved by poking 16418 with 0. The memory location 16418 is one of the computer's system variables and has the job of remembering how many lines are in the lower part of the screen.

Many memory saving techniques have been employed, the most obvious of which is the use of PI and PI+1 instead of 0 and 1. It is also cheaper in memory terms to say LET S=VAL "22" rather than LET S=22; a useful point to remember if you're running close to the limits of your computer's memory.

It is also worth noting that there is no limit to the number of print statements you can have in one line. This saves memory and also lets the program run faster.

The main repetitive loop of the program is from line 140 to 180. When B is pressed the variable C is set to 0 and then the main loop is made to include lines 100 to 140 which release and move the torpedo.

Maths Quiz

by Vic 20

This is a simple maths program for the unexpanded Vic20. First of all the program will print out a question either addition, subtraction, multiplication, or division.

The numbers chosen for the question will be in the range of 0 to 50 but this can easily be changed by changing the value in the find statements from 50 to whatever. If the answer that you input is equal to the answer then the computer makes a sound and prints a big tick.

If you answer wrongly then the computer makes a lower sound and prints a big cross. This program takes up about 11K.

Reflections

by ZX81

This program allows you to create your own patterns. It is deliberately short so that as much of the memory of the PR machine

to next page

Torpedo
by Jim Benyon

```

6  PDONE 16418 PI=PI
18 LET S=VAL "22"
29 LET H=VAL "12"
39 LET I=VAL "6"
58 LET D=PI-PI
68 LET T=PI-PI
78 LET S=VAL "2"
88 FOR M=1 TO VAL "51"
90 PRINT AT VAL "23",N,"",AT
I,N,
92 NEXT N
93 FOR F=1 TO URL "15"
94 PRINT AT R,A,,SHIP NO. "F",
95 PRINT SCORE " ",SC
96 PRINT URL " (RND+3+1)/G"
97 PRINT AT URL "20"
98 IF Y>20 THEN PRINT RT Y+G,
100 PRINT AT Y,X,"0"
101 IF Y<2 THEN GOTO URL "200"
102 LET Y=Y-G
103 NEXT M
104 IF M>A TO URL "25" STEP 2
105 IF INKEY$="B" AND S>PI/PI*T
HEN LET S=S-G
106 IF INKEY$="A" AND S>VAL "26"
THEN LET S=S+G
107 PRINT AT URL "5",M,
AT I,M," ",AT 22,5
108
109 IF C=0 THEN GOTO URL "100"
110 IF INKEY$="9" THEN LET C=0
111 LET X=S+URL "3"
112 IF C=0 THEN GOTO URL "100"
113 NEXT M
114 GOTO URL "250"
115 IF X=>INT M+G AND X=<INT M+
VAL "5" THEN GOTO URL "250"
210 GOTO URL "250"
215 FOR N=1 TO URL "15"
225 PRINT AT M,N," ",AT M,N," ",AT
M,N," ",AT M,N," ",AT M,N," "
226 NEXT N
227 PRINT AT M,M," ",AT M,M," ",AT M,M," "
228 PRINT AT I,M," ",AT I,M," ",AT I,M," "
229 PRINT AT URL "5",M," ",AT URL "5",M," "
230
231 NEXT F
232 PRINT AT 10,6,"YOU SCORED "
233 AT 11,T," "
234
235 IF INKEY$="" THEN GOTO URL
236
237 CLS
238 RUN

```

Maths Quiz
by Neil Sibley

```

PRINT 138 48745 QUIZ POKE36879,5
3 PRINT 1000000000 KEY TO STARTY PRINT
488
4 GETRS 1POKE "THEM4
20 B=17 48PRINT A:=1000000 31-221,381,481
100 2M POKING
101 GAI 7(50 POK(1)+1) W=INT(50RND(1)+1)

```

Open Forum

from previous page

as possible is available for the screen display.

When the program is run, four pixels appear on the screen. You will control the top-left pixel with the cursor keys — unshifted — in the top-left quarter of the screen. The computer produces the mirror images of your patterns in the other three-quarters of the screen.

If you hold a cursor fully down, the move will auto-repeat in that direction until it reaches the boundary when it will stop. To copy a finished picture, Break the program and enter Copy.

To start in a different position, move the pixel to the required position, Break the program, then Continue.

Lines 18 and 29 set the initial phase in the bottom-left corner of the 400 x 400 quarter of the grid.

Line 30 moves the pixel to the left or right if key A or S is pressed, and it hasn't reached the bottom line yet.

Line 93 moves the poet up or down using the
metaphor, as line 90.

Lines 50 to 100 plots the position of the Sun
over its daily rotation.

Line 110 returns control to the beginning of the loop.

Labyrinth

卷之三

In Labyrinth you are placed in an underground maze, from which you must escape before the keeper of the Labyrinth captures you. You suffer a fate worse than Sisyphus' white-out.

To escape from the maze you must reach the exit on the right-hand side of the maze. The maze is until, so you cannot see any obstructions until you meet them. As you and the keeper travel around the maze you have 10 occasions.

You are represented by the O and the Kuper by the X. Beware of the keeper, he homes in on you, and if he becomes angry he will cheat and slip between his obstructive forms.

You move using the cursor keys **5-6-7** and **8-9** in the direction shown on the key.

At the beginning of the game you are asked which level of play you want, this governs the ratio of machines you can make to the number the keeper can make.

卷之三

Turn to page 102 and ask for the level of difficulty you require.
From 10 to 120, set up the reading route.

Using 140 to 210 step the variables and print the unit

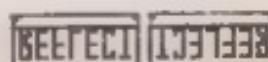
Levels 256 to 279 allow the player to level up by checking if he hits an obstruction or if he moves into open space and then prints the player at the position.

Unless 380 to 400 miles nearer than necessary to require its use you need not file the same route.

Units 479 to 529 describe if you have been captured or
kidnapped and point to decision, and offers you the
choice of several courses.

--

Reflections
by Simon Hilt



Open Forum

PROGRAM OF THE WEEK

```

100 PRINT "TO 19"
200 NEXT N
300 POINT AT 10-20
400 POINT N TO 5-1.
500 POINT N+1
600 POINT T
700 LET Y=1:LET X=1:LET Z=1
800 IF INKEY$="" THEN GOTO 100
900 IF INKEY$="S" THEN GOTO 100
1000 IF INKEY$="D" THEN GOTO 100
1100 IF INKEY$="A" THEN GOTO 100
1200 IF INKEY$="W" THEN GOTO 100
1300 PRINT Z,T,Y
1400 END

```

```

170 NEXT N
180 LET E=0
190 LET S=0
200 LET U=0: C=0: D=0: A=0
210 LET F=0: G=0: H=0: I=0
220 IF P=1 THEN LET D=0
230 IF P=2 THEN LET D=1
240 PRINT MT E S U C D A F G H I
250 IF P=3 AND D=1 THEN GOTO 470
260
270 GOTO 470
280 PRINT AT 10 19 AT 18 25
290 AT 3 25: Y=0: AT 0 25: "ESCAPE"
300 AT 3 25: IN: AT 7 25: C: AT 9
310 HOME
320 GOTO 500
330
340 PRINT MT 3 25: C: AT 9 25
350 PRINT MT 7 25: "DEPARTMENT 3 25"
360
370 PRINT AT 10 25: "MATERIALS"
380 44 44: GNL: AT 12 25: 44: ENTER
390 19 44: 44: OR 11
400 INPUT RS
410 IF RS<10 THEN RUN

```



YOU
ESCAPED
IN
230
HOUSES
ANOTHER
GAME
COMING

Win the great new ZX Spectrum

All you have to do to enter this award scheme is send us a programme in one of the following categories: (a) Games; (b) Educational/Scientific; (c) Business/Office software.

Programs for each category should be accompanied by a cassette, a copy of the listing and full documentation. Points will be awarded for use of machine code, innovation, structure and ease of use.

The overall winner will receive a ZX Spectrum and Printer, individual category winners will be awarded £30 of software, an 84 runners-up will receive programming merit awards.

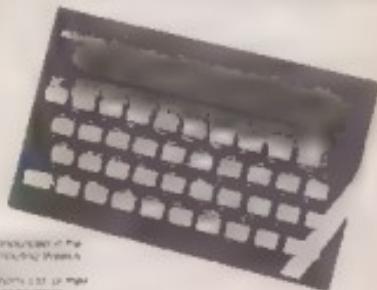
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Programming

How to pass Go and collect 200 variables

David Lawrence explains how to use variables as Goto and Gosub destinations.

When Sinclair first produced the ZX81, not a few people expressed the opinion that the way in which Goto destinations were expressed was extravagant and unnecessary. After all, it was argued, all that is really needed to cope with destinations in the range 1-255 is two bytes — the line numbers themselves are only two bytes long.

What possible use could there be for the way in which the ZX81 allowed anything which could be interpreted as having a numerical value to be used as the destination? I say 'anything' because I could also have expressed it as Goto code: 2 Goto val 130 Goto X. Goto 5+2+5 Goto 2*4+(Y) Goto A2.5! and an infinite variety of other expressions. The same is true for Gosubs.

At first sight this seems like sheer piracy in fact, it's a reflection of Sinclair's philosophy in providing the user with real flexibility to compensate for the ZX81's limitations. Many other errors, for instance, provide a useful command usually known as 'On ...' Goto (sometimes Goto

Off) which allows one or a variety of destinations to be chosen on the basis of a simple condition:

On > 0010 -> 0018.350.472.588

This means that whenever X is in the range 1-5, program execution will jump to the kth destination shown, otherwise the instruction will be ignored. This has the effect of replacing 'On' in this particular case, five if ... Then instructions.

If X=1 THEN GOTO 100
If X=2 THEN GOTO 101 etc.

The ZX81 has no such command. But the extraordinary flexibility of the way in which Goto destinations can be expressed does open up a variety of possibilities. On ... Goto itself can be emulated quite simply in 2 lines, such as:

10 LET A1 = 10024125412500
20 GOTO VAL A1&0:A1+1 TO X31

If there is a possibility of X falling outside the range 10 colours, the program is designed in case with, or if you want a default destination, the following could be used:

10 LET A5=10024125412500:
15 IF X>10 THEN LET X=5:
20 GOTO VAL A5&0:A5+1 TO X31

For anything other than the range 1-5, the program will now continue execution at



ZX81 — the extraordinary flexibility of the Goto facility opens a variety of possibilities

line 30. It could equally have been made to jump back — for instance to a menu with only five alternatives.

For those programming in BASIC it is also possible to use Code values of single characters as destinations provided that none of the destinations is greater than 255. As would need only to have as many characters as there are choices for destinations. The Goto instruction would take the form Goto Code AB:X.

It is also possible to design a program so that an input value can be used to directly determine a destination. Take the example of a program function to determine how many days have passed since the beginning of the year. The result is achieved by subtracting the number of days in the remaining months from 365. But note how the jump to the correct month to start subtraction is achieved:

```
10 LET N=NUMBER OF CURRENT MONTH:  
20 INPUT M:  
30 LET D=365:  
40 GOTO 40-10-M  
50 LET T=D-2-M  
60 LET D=D-31  
70 LET D=D-30 END
```

Where the number of lines permits, it is also possible to structure a whole program to allow an input to directly determine the destination for a Goto or Gosub. Take the example of a program which has a 'menu' of five functions:

```
100 PRINT INPUT CHOICE OF FUNCTION  
110 INPUT N  
120 GOSUB X*500  
130 GOTO 999  
140 SUBROUTINE 1  
150 SUBROUTINE 2  
160 SUBROUTINE 3  
170 SUBROUTINE 4  
180 SUBROUTINE 5
```

It is sometimes possible to base the calculation of a Goto destination on figures

arising during the course of a program, though this will often mean adapting a very irregular structure of line numbers. In the following example, the aim is to calculate the month in which a particular day of the year falls this day having arisen as the result of previous calculations:

```
10 IF B=10 THEN LET D=11  
20 GOTO 242  
30 STOP  
40 PRINT JANUARY  
50 RETURN  
110 PRINT FEBRUARY  
120 RETURN  
130 PRINT MARCH  
140 RETURN ==
```

Note how B must in this case be multiplied by two in order to ensure room for the Return instruction — there can, of course, never be a case of D=31.5. If this had not been done, we might have mistakenly numbered the lines.

```
31 PRINT JANUARY  
32 RETURN
```

with the result that nothing would be printed for day 32.

This principle can be applied whenever the action to be taken by a program varies predictably according to the value of a known variable.

Finally remember that the capacity to use variables as destinations for Gotos and especially Gosubs gives you the opportunity to put some structure into your programs by using named subroutines. Having decided upon the name for a routine, declare that name as a variable at the beginning of the program and give it a value corresponding to the line number at which the routine commences. From then on you can use lines like Gosub Applications which can help to make the functioning of a program much more comprehensible.

Sound & vision



Dumping it all on the printer

This is a simple program suitable for Petz and Vicx which dumps the contents of the screen onto a printer. It consists of two interactive loops, one for the length of each line and one for the number of lines

on the screen. The main routine inside this loop picks each position on the screen in turn, and converts the value into the correct CHR\$ code for printing.

Line 10100 adjusts the print output so that graphic characters join up vertically on the Commodore 4022 printer. I assume there is a similar process for the Vic printer. Line 10440 resets the 4022 printer to normal. When using this printer in this way the page 1/over facility is upset and so the top of the form will need to be reset.

Vic owners will be able to convert the program so that the variables LL (line length) and NL (number of lines) can be calculated by picking control registers 3 and 4 and masking out the unwanted bits.

In control register 3 (36666) bits 0-6 contain the number of columns in the video memory. In control register 4 (36667) bits 1-6 contain the number of rows in the

video matrix. The following statements will calculate the values:

LL=PEF+10200 AND 1071
NL=INT(LL/10200) AND 1071

It should be possible to use this routine to dump Hercules graphics onto the printer, but I have not tried it. I would like to hear if anyone has any success. Also, the top of screen variable will have to be altered depending on the method used.

Pet owners with 80 column screens will need to omit lines 10200, 10320 and 10390, and change line 10340 to Print#1. Note that the Print# statements must be typed in full, ?# is not allowed.

The program can be added to the end of the user program which intends to call it or can be loaded after the screen is completed — as long as the user program is larger in size than the Screenprint program.

Ken Clark

```
10000 FISH *** SCREENPRINT ***
10010 REM
10020 IF TS = TOP OF SCREEN :POINTERS: FOR PETT'S TS = 32768
10030 FOR VIC'S WITH MORE THAN 8K OF MEMORY TS = 1824
10040 :--: OTHERWISE TS = 7680
10050 REM
10060 REM LL = LINE LENGTH: FOR VIC'S LL = 22
10070 REM FOR 40 COLUMNS PETT'S LL = 40 . FOR 80 COLUMNS PETT'S LL = 88
10080 REM
10090 REM NL = NUMBER OF LINES: FOR PETT'S NL = 25 . FOR VIC'S NL = 23
10100 REM
10110 REM TS=32768:LL=40:NL=25
10120 REM
10130 REM *** OPEN PRINTER AND ADJUST SPACING FOR GRAPHICS ***
10140 REM
10150 REM OPEN A,4,1,PRINTER:CHR$1,A,1:CLOSE 6
10160 REM
10170 REM *** START SCREEN BOX ***
10180 REM
10190 REM
10200 PRINT#1,"":FOR Z=1TO11:PRINT#1,"-":NEXT Z:PRINT#1,"-"
10210 FOR VLOOP=1TO8,
10220 PRINT#1,"-":>
10230 POP XLOOP=1TO8
10240 REM
10250 REM *** GET A CHARACTER FROM THE SCREEN AND CONVERT ***
10260 REM
10270 READ(TS)
10280 IF P = 171 AND S = 124 THEN PRINT#1,"Z":CHR$(P+11)*8:10001010220
10290 IF R = 121 THEN PRINT#1,"Z":CHR$(R+64)*8:10001010220
10300 IF R=62 AND S=64 THEN PRINT#1,CHR$(P+128)+1,10001010320
10310 PRINT#1,CHR$(P+64)+1
10320 TS=TS+
10330 IF T XLOOP
10340 PRINT#1,"-"
10350 NEXT VLOOP
10360 REM
10370 REM *** FINISH SCREEN BOX ***
10380 REM
10390 PRINT#1,-":FOR Z=1TO11:PRINT#1,"-":NEXT Z:PRINT#1,"-"
10400 REM
10410 REM *** CLOSE & RESET PRINTER ***
10420 REM
10430 CLOSE#1
10440 OPEN#1,4,10:PR#1:CLOSE#10
```

Peek & poke

Post your problems to our address. Ian Beardsmore will poke back an answer.

Q. WHAT DO I DO NOW PLEASE?

David Scott of Inverary, Argyll, Galloway, File, writes:

I am at present the owner of a Tandy pocket computer, but I am considering buying a larger colour computer such as the ZX Spectrum, or a Vic20. I wonder if you could answer some questions for me.

Is there any memory expansion available for the Vic20 larger than 48K? Are there any plans to let the Spectrum or the Vic20 be suitable for other languages such as forth, CP/M or Pascal? What can the RS232 interface be used for, besides printers?

Do you any details of the Vic20 and the Vic64 new colour computers? What sort of price are they?

Are the Spectrum and the Vic20 capable of outside communication, ie modems? If so, who supplies them? Also, do you publish programs for the Tandy pocket computer?

A A lot of questions to answer, but here I go. There is a disk drive available for the Vic20 which stores 174K, that can be accessed in 684 blocks. There is a review of the disk drive in our May 20 issue. The drive is available from Commodore in Slough, for £29.

Commodore do a forth emulator for the Vic and forth is available for the ZX81. So, a Spectrum version is very probable, given that ZX81 Basic is more or less a complete subset of Spectrum Basic.

CPM is, to my knowledge, not available for the Vic. It is a Z80-based system, so it is possible that it might be developed for the Spectrum at the coming months, especially once the microdrive is released.

An RS232 interface can be used for printers or for modems. While it is used to interface other peripherals, the printer option is the most common. Depending on the individual computer, the RS232 can be used for sound boards, extra graphic boards, control

packs and for the external control of anything from model railways to robots to Viewdata access.

I wrote about the Vic20 in PCW, July 15. The Vic64 is just a 64K version of the Vic20 with all the RAM onboard, and 20K joystick Ram. It has two joysticks and four paddles. The price being discussed is £500 and the planned release date is early 1983.

At the moment, I do not know of any modem hardware actually available for the Vic20. As far as the Spectrum is concerned, the first models are only getting through now.

As for programs for the TRS80, we are happy to consider programs for any computer. It is sometimes said that we are monopolised by a few machines. What we publish tell us what we are sent. We cannot publish programs for machines if no one sends them to us.

TO ERROR IS HUMAN IS IT HOT?

Dave Webb of Newent Avenue, Sandbach, Cheshire, writes:

Q I would like to know how to Poke the error code off the screen using a ZX81. In the same way you can on the Z80P.

A You cannot Poke the error code off in the same way as you can on the ZX81, or ZX80 with new ROMs. If you were to move the error code, first ensure that you are in Fast mode. Next, make the last line of your program `LET L=USR 481`. When you have done this, the program will stop but there will be no error code.

OR TO BE HUMAN IS AN ERROR?

W E Rodgers of Sheldon Road, Dagenham, Essex, writes:

Q I have two points about which I would like your opinion.

Firstly, in the faulty Rom test in the May 12 issue of PCW, the line Prior 7==32-1 gives an answer rounded up to

4294967308 not 4294967296 as stated.

Secondly, in the program Music 2, for the ZX81, I keep getting an error code 2 followed by a line number. The line number that follows is always a line that reads `S 1 N 2 2 630` but it is not always the same line number.

A The answer to your first question is that your ROM should be all right. The correct answer was worked out the old fashioned way by pencil and paper. Because the ZX81 is only accurate to 4 places, it has to round off or drop any digits after that (see letter PCW, July 2).

The second problem is caused by a printing error. The +1 should go inside the inner set of brackets, so the line should read

`+1 OSUD100.10THROMD+1`

This generates a whole number between one and nine and their multiples by 100. The form as printed gives a number between nought and eight, multiplies this by 100 and then adds one.

So, if the number six is generated this will become 600 plus one. The computer is trying to divide 601, but it cannot do it because the next command waiting on from there. When adding to 100 it shows another code because it has not been to zero and therefore does not know what % is.

TO B OR NOT TO BE, THAT IS . . .

M Hubbard of Robert Addis Crescent, Hullme, Manchester, sends:

Q Please could you explain to me the difference between a model B BBC microcomputer, and a model A micro with a £35 16K memory expansion — apart from the obvious £60 and the printer port. How easy is it to upgrade the model A to the B? I am interested because, apart from financial considerations, there is less demand for the A and so less waiting time.

A Essentially, the difference between the two is the much greater flexibility of

the model B. It has several ports and interfaces that the A does not possess.

The first and probably most useful extra is the Acorn Tube which allows the use of a second processor. This second processor does not have to be a 6502, but could for example be a Z80. This automatically opens up the vast field of CP/M for the BBC user. It also makes the operating times a lot faster because the first 6502 chip does not have to stop calculating to output data. The calculations can all be done simultaneously by the second processor.

The model B also has an RS232 port for use with a serial printer or modem. Other extras include an RGB output for monitors and an analogue port for use with joysticks or laboratory interface.

When you pay the extra for the model B you are paying for potential, as represented by the extra ports. Whether you think it is worth the extra money is up to you, but perhaps you can now understand why the model B is out-selling the model A by about two to one.

It will probably become possible to upgrade the model A to near the specification of the B by using mother boards with additional ports and when they come on to the market. This will I'm sure, in the long run cost more, and I doubt if the Amstrad Fabs will ever become available.

STOP agonising over that niggling problem. Write to Ian Beardsmore at Peck & poke for the answer. Letters should be as brief as possible and include full name and address. Try and limit yourself to one question per letter. Write to Peck & poke, Popular Computing Weekly, Hubhouse Court, 19 Whitechapel Street, London WC2 7JF.

Competitions

It's cool to be a perfect square

A perfect square is a whole number, the square root of which is also a whole number — 4, 9, 16 and 25 are all perfect squares. Any whole number, multiplied by itself, gives a value which is a perfect square.

A number of family games are linked to that of perfect squares. Roughts and crosses is played on an array of nine cells arranged in three rows of three. This is said to be a square of order 3. Similarly, a chessboard is a square of order 8, and the oriental game of Go is played on a grid of order 16.

Let us take a look at some of the properties of square numbers. First, write out the eleven numbers 0 to 10 and, underneath, write their squares.

0 1 2 3 4 5 6 7 8 9 10
0 1 4 9 16 25 36 49 64 81 100

Notice how the last figure of each of the square runs in the sequences 0, 1, 4, 9, 6, 5, 6, 9, 4, 1, 0. This can be useful as a negative check. If the last figure of any number is either 2, 3, or 7, then that number cannot be a perfect square.

A simpler check can be carried out using the digital root of a number. To find the digital root add together each of the digits, and then, if this total is more than one digit, add those digits together until a single digit remains. For example, the digital root of 734482149038 is 7 + 3 + 4 + 4 + 8 + 2 + 1 + 4 + 9 + 0 + 3 + 8 = 51 - 5 + 1 = 6.

This tells us that the number cannot possibly be a perfect square. To see why, here is a

program that finds the digital roots of successive square numbers up to 900. If you run it, you will see that the digital roots form a cyclical sequence comprising just four different digits. If our digital root is not one of these, then that number cannot be a square.

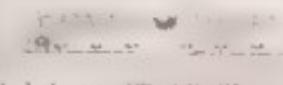
```
10 FOR n = 1 TO 10
20 LET A$ = STR(n)
30 LET A = 1
40 FOR M = 1 TO LEN(A$)
50 LET A = A + VAL(A$) MOD 9
60 NEXT M
70 IF A > 0 THEN GOTO 20
80 PRINT A
90 PRINT N
200 LET A$ = STRB A
210 GOTO 20
```

This provides us with a useful negative check.

Puzzle No. 15

Can you find (a) the lowest and (b) the highest perfect square that can be made using in each case the nine digits 1 to 9 (each digit is used only once, and zero is not used)?

Solution to Puzzle No. 11



The path has a total distance of 254 metres (48 miles, 200 yards), making it an incredibly inidious knot.

The program to give the solution works by incrementing C by 2 to give the distance between each successive knot. This is added to H to give the distance to the knot and hence

the distance (to allow for the return journey) is added to T, the total distance. Then,

The program stops as soon as H exceeds 5286. R is 11 miles.

```
10 LET T = 0
20 LET H = 0
30 LET D = 0
40 LET T = T + 2 * H
50 LET D = D + 2
60 LET H = H + 2
70 IF H < 5286 THEN GOTO 40
100 PRINT "TOTAL DISTANCE = ", T, " FEET"
```

Rules

The winner of the puzzle will be the reader who, in the opinion of Popular Computing Weekly, has submitted the best solution. Preference will be given to solutions which show how the entrant arrived at the correct answer.

Entries containing entries should be marked clearly with PUZZLE.

The closing date for the competition is Tuesday, August 10.

Winner of Puzzle No. 11

The winner is Gary Johns, Dagen Way, Colne Englands, Colne, who receives £10.

Solution to Crossword No. 11

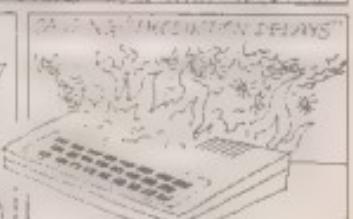
Across:	2. Acne, 3. Hospital, 10. Elements,
7. Dr., 13. Letters, 14. Flap, 17. Links,	18. Telephone, 20. Shampoo, 21. Pet,
Down:	1. Laundry, 2. Telephone, 2. pH meter,
4. Dusty, 5. Age, 6. Cardiograph, 7. We,	12. Remedy, 13. Theory, 15. Relay, 17. List,
	19. Say

Winner of Crossword No. 11

The winner is L. Lightfoot, Lyndhurst Avenue, Caversham-Meads, Ascot, who receives £10.

CITIZEN PAIN

BY DAVID IRELAND and JAMES MACDONALD



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